The Builder.

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Portland Stone.

MANY years have elapsed since anything original has appeared in regard to the stone raised in the isle of Portland, and as we believe that the material now obtained is but very little understood by architects, in spite of the fact that it is so extensively used, we venture to offer the following remarks, based on a recent detailed examination of the stone both in the quarries and the laboratory. We may seize this opportunity also of giving a brief account of its history, and of some customs peculiar to Portland in connexion with the stone industry, not generally known, and which have had their influence from an architectural standpoint.

HISTORY.

A few years ago some remarkable bee-hive-shaped excavations, believed to have been made in prehistoric times, were discovered in removing the overburden in quarries a little to the east of the road from Yeales to Easton. They were for the most part dug in rough stone of Purbeck age, but extended also, in some cases, down to the Portlandian series. They were walled by rubble, were from 7 ft. to 8 ft. in height, and about 9 ft. in diameter at the base. The entrance to these underground chambers was by a narrow opening in the middle of each roof, which was covered by flagstones; the floors of the chambers were of the same material. These are probably the earliest examples of the use of Portlandian and Purbeckian stone for building purposes of which we have any knowledge, though it is true the material used is not from the approved building stone beds of the present day.

The Normans used Portland stone in the construction of Bow and Arrow (Rufus') castle on the east side of the island, the corbels, &c., of which, made of Whitbed presently to be described, are in excellent preservation, as we can testify. The old parish church (*circa* 1475) now in ruins, Wyke Church (also fifteenth century), and Sandsfoot Castle (sixteenth century) were also built of this oolite. It was not until the reign of James I., however, that the stone became generally used. A work entitled a "Particular Survey of the Countie of Dorset," written in 1732, by "Mr. Coker, of Dorset," informs us that "Portland hath plentie of excellent quarries of stone, that for solidnesse and durablenesse it is transported into London and that in great plentie, sithence it pleased the King (James I.) Anno 1610, by the advice of his Architecturars to make choice of Portland stone for the reedificing of his Banquetting House at Whitehall." Inigo Jones restored a portion of old St. Paul's "casing the outside, and adding a grand Corinthian portico to the west part, all of Portland stone."

Every one knows that the present St. Paul's Cathedral, several of Wren's churches, &c., were built of this material. We learn that in 1665 Charles II. granted 12d. per ton stone duty, 3d. of which was to be paid for the King's use, and 9d. to be retained by the loyal inhabitants who stood by his father. St. George's Church, near Easton, was built of fine-grained Roach, 1764.

According to Professor Hull, Portland stone was largely employed in the city of Dublin, and, in fact, from early times was sent long distances. The columns and portico of the Bank of Ireland (formerly Parliament House), founded in 1729; the Custom House, 1781; General Post-Office, Royal Exchange, and parts of Trinity College, are examples of its use in Ireland.

Apart from the architectural beauty and quality of the material, there can be no doubt that proximity to the sea, and hence cheap water carriage, was an important factor in its extended employment in late Mediæval times and down to the period of the introduction of railways. Since then, however, although still very actively exploited, it naturally has suffered from the competition of freestones from other parts of the country which were previously comparatively inaccessible and practically unknown.

CUSTOMS.

The stony nature of the island undoubtedly impressed itself on the character of the inhabitants in ancient times, as it also materially influenced the styles of their buildings. Even at the present day, when the residence of so many Government officials might be anticipated to have altered all this, we still find vestiges of the ancient life and thought, especially amongst the quarrymen and natives of the high sloping plateau crowning the island. The village streets are broad, and flanked on either side by quaintly-built stone houses, some in ruins; the boundaries between various properties are defined by stone walls, whilst stone quarries are met with on every side; in fact, everything seems to be indissolubly connected with stone. The almost entire absence of trees imparts a barrenness to the whole, which, if not picturesque, impresses itself very forcibly on the mind of the visitor. The old-fashioned stone-carrying carts, with peculiarly-shaped wooden wheels and still more curious axles, drawn by teams of sixteen horses, are not the least interesting features in this land of desolation.

It is not surprising amidst such surroundings that many ancient customs and privileges yet survive, so little interfered with by modern legislation—especially those relating to the stone quarries. In Saxon times the manor belonged to the Crown, and after many vicissitudes is yet retained by Her Majesty. The inhabitants, at any rate those on the high ground, are almost all freeholders, so that the majority of the quarrymen live in their own houses. The tenure is "gavelkind," whereby the father's lands, at death, are divided equally amongst the sons. Lands and quarries in the island may be sold by what is called "Free Church Gift," which means that any freeholder (or tenant as he is termed by custom) desiring to sell his property, instead of employing a solicitor in the usual way, may dispose of it in church, receiving the purchase-money there in presence of two or more tenants. The transfer is notified by an instrument called "Church Gift," and the act is duly recorded in the parish or manorial register—a simple and inexpensive method of buying and selling, much to be envied.

Tenants, and persons belonging to the parish employed by them, but no other persons, have a right to open and work what quarries they please on the Common land, provided they do not thereby injure the highways, but must pay the customary duty; and all tenants have from time immemorial raised what stone they pleased in their own respective tenements. Those who quarry on Common land have a right, free of duty, to place superfluous rubble, &c., on any of the recognised rubble grounds; but persons working quarries in their private grounds must for this privilege pay a fixed sum per ton on the quantity of wrought stone, the raising of which occasioned the rubble. Tenants may erect piers with cranes for shipping stone on any part of the Common land on payment of a nominal acknowledgment to the lady of the manor, as for an encroachment, and on notifying the quantities of stone shipped from time to time. Any person clearing away overburden on Common land with a view to quarrying the stone beneath, and not, within two months thereafter, opening and regularly working the quarry; or omitting at any time thereafter for the space of two months to fairly work such quarry; or excavating stone

underneath and without first removing the overburden; or opening any such quarry nearer in advance or ahead of any other quarry previously in work than 300 ft., is deemed guilty of irregular and promiscuous working and wasting of stone, and must suffer certain pains and penalties accordingly. From this we see that the method of getting stone by mining is not recognised in Portland. Where in working quarries in either private or parish lands in the cliffs a public road would be destroyed, or worked through if the work were continued, it is the custom for the proprietor of the adjoining land to allow an equally convenient roadway through such land on receiving the tonnage dues for the stone raised under the road. And there are many other interesting customs as to the method of quarrying, &c., to which, however, we need not allude.

THE "ISLAND."

In reality Portland is not an island, but a promontory, though everyone alludes to it in the former sense. It is joined to the mainland by the Chesil Beach, a remarkable accumulation of rolled pebbles, flanking which are the road into Weymouth and the line of railway. The sketch map (fig. 1) gives a few topographical details, sufficient to enable the reader unacquainted with the district to

FIG. 1.

FIG. 1.—*Topographical Map of the Isle of Portland.*

follow our description of the quarries, the sites of which are also shown on the sketch. The geology of the island has been adverted to on a former occasion in our columns (*ante*, p. 294), so that we need now only remind our readers that but three solid formations—the Purbeckian, Portlandian and Kimeridgian — occur therein. The section (fig. 2) from north to south shows the general disposition of these. As will be gathered, the Purbeck beds are very thin, and are removed where they exist, in the process of quarrying. They consist for the most part of rubble and tile-like pieces of stone, together with clay, &c. The uppermost part of the Portland series is also taken away as overburden, the good stone not being reached until some few feet thickness of this are penetrated.

BEDS AND JOINTS.

The marketable stone is, broadly speaking, of three kinds, as described in detail in our Student's Column not long since (*ante*, p. 294). They are, in descending order—the Roach, Whitbed, and Basebed. The Roach is joined to the Whitbed, there being no bedding plane between. The former is full of small holes and cavities caused by the removal, chemically, of certain of its fossils, which structure passes insensibly into the Whitbed, where the material is solid throughout, but contains much shelly matter. This latter, however, decreases towards the base, and is practically non-existent in the Basebed, except as very minute fragments only seen by aid of the microscope. The Whitbed may easily be distinguished from the Basebed by reason of its coarser texture and light brownish tint, the Basebed being white. In some parts of the island, beds are duplicated, or the Basebed is not worked, as will presently be shown.

The general micro-structure of the various stones was described and illustrated (*ante*, p. 295), and need not be further referred to.

Speaking broadly in regard to joints, it may be said that for such a thickness of stone, bedding planes are far apart, but vertical joints are in some quarries in the island very close together—only a foot or two from each other. For this reason it is in such localities difficult to obtain wide blocks, though they are thick enough on the bed. The wholesome rule that building stone should always be placed on its "natural bed" in erecting an edifice is, naturally, rebelled against by some of the stone merchants in the island. Indeed, we imagine that in many cases this rule could not possibly be adhered to in regard to Portland stone, where very large blocks were required —specifications to the contrary notwithstanding. In this particular instance we are of opinion that the keeping or breaking of this elementary precept is not a matter of much moment. For Portland stone is not laminated in the true sense of the term like some other oolites and most sandstones; it is difficult even to see the direction of bedding in a block, though the mason can usually determine the "breaking way" when handling the material. If the blocks are, therefore, occasionally built "end on," very little if any harm would ensue—at least in the better qualities of the stone.

The vertical joints are usually mere cracks, but here and there widen out into "barrs," lined with calcite or aragonite and displaying small stalactites and stalagmites to perfection. In most quarrying districts the larger joints are filled with ferruginous earth which discolours and depreciates the quality of the stone in their immediate vicinity; but, in Portland we did not discover that the material was in any way affected in this manner, and we paid special attention to the point. The larger joints traverse the beds in a direction from N.E. to S.W.

METHOD OF QUARRYING.

As previously remarked, all the quarries are exploited in the open. They are worked along a face, and odd blocks and rubble are either thrown behind as the face advances, or are thrown over the edge of the precipitous cliffs, considerably disfiguring them as seen from the sea on the west side of the island. The accompanying reproduction of a photograph (fig. 3) illustrates the general method of quarrying. In this instance a large quantity of the overburden has been removed, and the men are standing on the workable stone which is about to be taken out along the excavated ditch. There seems to be but very little attempt to restore the surface of the ground worked over, and, when once the soil is broken for stone getting, it is, therefore, lost —perhaps for ever. No one could walk from Yeales towards St. George's church without being struck by the wanton waste of land, the appalling desolation produced by this greedy method of quarrying. No excuse, on whatever grounds, is admissible for the creation of such a wilderness.

There are no steam cranes in any of the quarries; and the present method of employing hand cranes, held in position by large baulks of timber, or iron rods, is possibly the most economical that could be devised, seeing that the beds of stone are not thick, a circumstance necessitating frequent shifting of these appliances. The capping and overburden are generally removed by blasting with dynamite and powder; but the building stone is never raised by this means, as it would be shattered too much. Portland stone is not sawn *in situ*, but the blocks are detached by cutting channels, or "rifts"—the operation being known as "cutting a drift," or "reaming"—and by the subsequent use of "scales" and wedges.

Each quarry is worked by a "company," or gang of four or five men, and about 525 men are altogether engaged in quarrying; in addition, there are about 75 masons, &c., making a total of 600 hands employed in the Portland stone industry. Masons, and men working in saw-mills are paid by the hour; but quarrymen and quarry-labourers are paid piece-work by the ton, not per foot as in some other stone districts.

QUARRYING TOOLS.

In addition to the usual complement of jemmies, bars, hammers, &c., there are certain tools used in quarrying in the island which are sufficiently peculiar to warrant a short description. Three of these are selected for illustration (fig. 4). The kevil

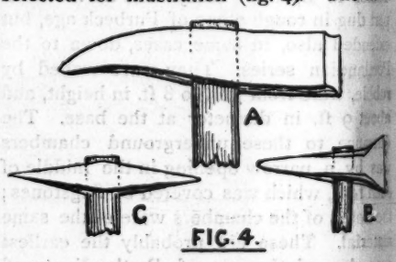


FIG. 4.

FIG. 4.—*Portland Stone Quarrying Tools.*
A=Kevil. B=Stone Axe. C=Twabill.

(pronounced "kivvil") is a tool with a rather blunt point at one end, and two vertical cutting edges, one on either side of a hollow, at the other. It varies in size, large kevils weighing as much as 20 lbs. It is used for rough dressing or "pitching": the pointed end for detaching superfluous pieces, and the cutting edges for subsequently shaping blocks. As a rule, the smaller kevils have sharper points. The stone axe (B) differs from that used in other districts visited. It has a point at one end, and a vertical cutting edge at the other. This modification was probably brought about by the circumstance that the kevil does most of the actual stone hewing. The twabill (pronounced "twybill") is a kind of pick with a point at each end; it is used for channelling, &c. "Scales" are thin flat pieces of steel or iron, placed one on either side of a wedge in splitting stone asunder. The tools belong to the men.

FIG. 2.

FIG. 2.—*Geological Section through Portland.*
a=Purbeckian. *b*=Portland stone. *c*=Portland sand. *d*=Kimeridgian.

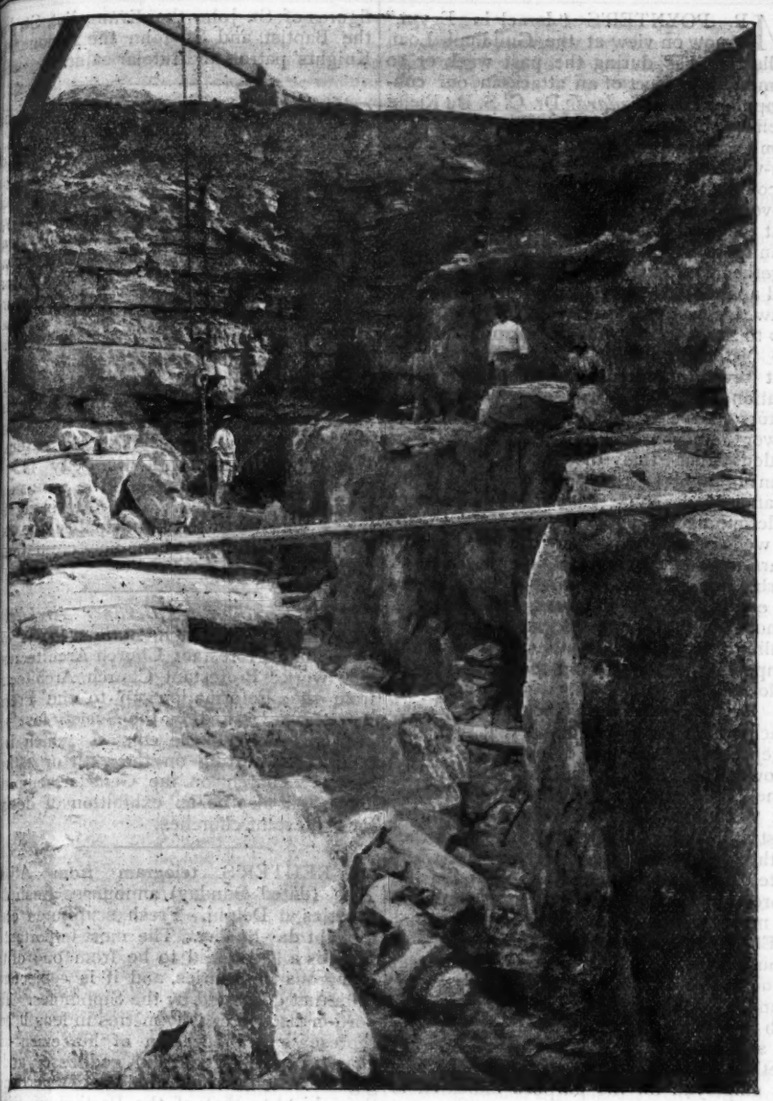


FIG. 3.—*Method of Quarrying the Stone.*

CARRIAGE.

Light horse-tramways are used in the ority of the quarries for moving blocks m place to place. Indeed, in the northern of the island a regular network of per-nently established tramways exist. Trac-n engines are also employed to carry the e, and there is quite a depôt for them at steam-sawing and masonry works near iswell railway station. The use of massive s with large teams of horses, in stone-draw-has already been referred to. A railway s under construction for years on the high ping plateau, but is now in a very dilapi-ed condition. The stone is sent away m the island (1) by rail from Chiswell rtland) station; (2) by road, running allel with the Chesil Beach, into Wey-uth; and (3) by ship from the piers.*

NOTES.

WE publish on another page a correspondence between some architects who were competitors for the Harris Technical School Preston and the Secretary to the Harris titute, which deserves attention. The hitects signing the letter state that it s a condition of the competition that whole cost of the buildings was not exceed 8,500*l.*, and that the Council have lected a design which is to cost 13,000*l.*; d further, that it was stated by a member the Council that the design in question d to be cut down even to come within the t of 13,000*l.* They inquire whether the sign in question is to be carried out according to the plans sent in, or whether they include any greater extent of building than the 8,500*l.* was stipulated to provide for; pointing out with perfect truth that if a design has been selected which is materially beyond the stipulated cost, those competitors who have kept within that cost have suffered a grave injustice. It might be supposed that the Council would be desirous, in consideration of their own reputation for fair dealing, at least to explain the misconception, if there is any. But they give merely a *non possumus* answer; they are "unwilling to enter into any controversy" on the subject, and state that a competent and independent assessor selected the plan as the best and most suitable, and that no competitor has any reason to complain. Now there may of course be another side to the matter, but if the Council of the Harris Institute think that their reply is one which can or ought to satisfy the other competitors or the architectural profession, they are much mistaken. If the facts are as stated, the assessor has not done his duty. It is one of the first duties of an assessor in a competition, and one of the very objects with which an assessor is appointed, to see that the advertised conditions of the competition are strictly complied with. This procedure of advertising a competition with a defined limit of cost, and then selecting a design which is materially beyond that limit, is of constant occurrence, and it amounts to a flagrant breach of faith with the competitors. A further explanation is required, and we call upon the Council of the Harris Institute, or their assessor in the competition, to give one. A charge such as is made in the letter of the four competing architects is not to be disposed of in that lighthearted manner.

* To be concluded in our next.

A LETTER by "A Capitalist," in the *Times* of Thursday, deserves the serious attention of those labour leaders who are paralysing the trade of England by demanding rates of wages at which, if things go on as they are going, it will very soon be impossible for any one to expend capital in manufactures with any chance of a return. The writer states that his particular trade is extending in all parts of the world, and everywhere except in England is yielding from 10 to 30 per cent. of profit. He can only see a settled determination on the part of the workmen to extract every penny of profit from him, and on the part of the Government to make him pay every year a larger proportion of taxation. The consequence is that while during the first twenty years of his experience the returns were sufficient to provide for renewal and gradual extension of plant, during the last ten years each year has produced diminished results, until there is now no profit at all. Under these circumstances, says "Capitalist," "I am quietly working out my plant, and I know many others who are doing likewise. . . . . Capital must have its remuneration, and if I am correct in my views that it does not now receive any return, whether employed in agriculture or in manufacturing industries, the time is not far distant when the army of our unemployed will be counted by its millions, and our industries will be lost never to return. Government and trade unions seem to be conspiring who can first drive capital out of the country." But we fear it is hopeless to expect that those who are urging this country in the direction of industrial ruin will see the sense of this, until they are taught by the severe logic of circumstances.

THE result of last season's excavations on the site of the ancient Roman city of Silchester, near Mortimer, Hants, have been exhibited at the rooms of the Society of Antiquaries at Burlington House. To quote the report, the work consisted of "the examination of (1) the remainder of the large *insula* vii. south of the *forum* and *basilica*, containing the round temple which was partly excavated in 1892: and (2) of the double *insula* viii. which extends southwards from *insula* vii. to the city wall. Also (3) the excavation of the northern half of a new *insula* ix. west of *insula* i. and north of *insula* ii., and (4) of that part of the city in the angle by the east gate." The chief result of these excavations has been the discovery of two buildings, one (of which a large-scale model has been made by Mr. G. E. Fox) a house of the "courtyard" type—as distinct from the "corridor" type—in an unusually perfect state, with another house of the "corridor" type adjoining, and foundations of other buildings; and a large building, thought, from its position near the baths and the south gate of the city, and also from the arrangement of its rooms, to have been an inn or hospitium for travellers. There are three large hypocausts in this building, which is built round three sides of a court-yard, and rivals the *forum* and *basilica* in size. To the east is the drain from the baths, with a sluice-gate in the city wall. Several other objects of interest have been discovered—Samian and other pottery fibulæ of various shapes, two—in the form of a fish and a shoe—being especially noticeable, the latter retaining an inlay of enamel; a piece of a border of a mosaic floor in grey, white, red, and black tesseræ, and a number of architectural fragments in stone, chiefly capitals of plain character, and moulded bases. One of these latter, circular in shape, is thought to have belonged to the circular or polygonal temple in *insula* vii. A stele or monumental stone with an inscription in Ogham characters was also found, and several portions of tiles with the imprint of birds' claws and animals' feet,

while one fragment bears a portion of an inscription. The excavations are to be resumed this year, and it is much to be hoped that the planning of the whole city may not be left incomplete through lack of funds to carry on the work, It is by far the most interesting and valuable contribution to our knowledge of the planning of Romano-British cities that we have had for many years.

WE are glad to be able at last to give some definite particulars as to the pre-historic city laid bare by the drainage of Lake Copäis. According to Herr Noach's report in the last issue of the Athenian "Mittheilungen" (xix., 1,) the remains in question lie in the north-east quarter of the lake, opposite Topolia. They are uniform in character, clearly of Mycenæan date, and not, as was at first supposed, belonging to several successive periods. The ruins go locally by the name of Gla or Gulàs. The strongest side of the massive fortifications is that looking south. The system of fortifications includes four gates, one to the south-east being double. According to Herr Noach the whole plan is only intelligible on the supposition that there was some system of draining and flooding the site. It is intimately connected with the whole system of the Mycenæan dykes and dams, and the newly-discovered city is the key to this system on the north-east as Orchomenos is on the west. The two seem to have been connected and strengthened by a system of smaller forts round the northern bank of the lake, and these from the vase fragments found are clearly shown to be of Mycenæan date. Two such forts stand on small peninsulas near the Katawothre Varià, and a third lies on the summit of the Pyrgos of Hagia Marina, and thus defended the point where the several channels meet in one main canal. The system provided for keeping open the communication between the two principal places, Gulàs and Orchomenos, and the sea. We have to picture Larymua as the chief harbour of the Minyans, although so far only vases of proto-Corinthian date have been actually found there. Finally a comparison of literary accounts with the existing topography, as disclosed by the drainage, seem to point to the conclusion that in the ruins of Gulàs we have the pre-Bœotian Arne, the royal city of Athamas and his descendants.

DR. KEKULÉ has just published and dedicated to Professor Brunn a remarkable monograph on what he calls "a female draped statue from the studio of the pediment figures of the Parthenon." The monograph is remarkable not for its title (which is all but untranslatable), but because it is a salient instance of what yet remains to be done in the way of identification and classification of supposed Græco-Roman statues in Italian and other museums. The statue in question came into the possession of the Berlin Museum in 1892; it was bought from a dealer who got it from the Villa Brazzà ai Fornaci, near Dolo, between Venice and Padua, and according to tradition it came to Venice in Morosini's time. This, added to the fact that it is of Pentelic marble, might have naturally aroused attention, but so disfigured was it by conventional restorations that till now it has escaped attention. Stripped of these restoration, as it is in the phototype reproductions, it would catch the eye even of the elementary student, who would date it as Pheidian. Into the details of Dr. Kekulé's argument we cannot enter, we can note only the chief point. The left foot is substantial y raised and rests in the estoration on a modern tortoise; for this Dr. Kekulé substitutes a goose, a somewhat surp:ising substitution to the modern mind. But the goose was the bird of Aphrodite, and in the figure we have, if Dr. Kekulé be right, a Pheidian Aphrodite, unhappily headless.

MR. POYNTER'S "Israel in Egypt," now on view at the Guildhall Loan Collection, has during the past week or so formed the subject of an attack in our contemporary the *Standard*. Dr. C. S. Du Riche Preller commences by stating that the number of Hebrew slaves harnessed to the ten-wheeled wooden cart whereon is placed a colossal sphinx, is totally inadequate to move the enormous weight. By assuming that the sphinx is intended to be made of granite or syenite, he estimates its weight, together with that of the cart, at 100 tons, and about 1,000 men would be required to draw this weight along, whereas only about 150 to 200 men are employed, apparently, in the pictorial representation. He submits that "even in a picture there should be some relation between two such elementary factors as the weight of the load and the power required to move it. But it is evident that this discrepancy has only been brought to the fore by Dr. Preller to afford him some excuse for altogether undermining the subject of the picture. He is well acquainted with the method of quarrying and moving the gigantic blocks of marble in the Carrara district where bullocks are employed to do the work, and he thinks it most likely that the ancient Egyptians in hauling their colossal statues, or the blocks composing their monuments, utilised bullocks also, instead of men as shown by Mr. Poynter. Another writer, "Student," attacks this view and explains that the artist in representing men as doing the work has followed the very best authorities possible, namely, the ancient Egyptians themselves. But "Student" was not very happy in his illustrations, which drew forth a rather scathing reply from Mr. Preller, and it is quite clear that the latter is still under the impression that bullocks were employed, and not men. We may point out, however, that at El Bersheh, in the well-known tomb of Tahutihotep, there are paintings of a colossal statue on a sledge being drawn by 172 men, arranged in four rows of forty-three men in each row, whilst a foreman is pouring oil on the sledge to make it run easily. So that whether bullocks were or were not occasionally employed for the purpose indicated is entirely beside the point; it is certain that men were so utilised, and Mr. Poynter was therefore quite justified in his representation. In regard to other points raised by Dr. Preller, we presume if they are to be adopted, the painter of imaginative pictures of the future will have to be guided, not so much by artistic effect, as by mathematical problems and engineering considerations of foot pounds!

IN a "Note" on July 30, 1887, we described the then condition of the crypt beneath St. John's Church, Clerkenwell.* The Chancellor of London, at a sitting of the Consistory Court on the 11th inst., agreed to issue a faculty for removing the human remains of 325 bodies from the crypt to Woking. The Medical Officer of Health for Clerkenwell, and Dr. Hoffman on behalf of the Home Office, are agreed that upon sanitary grounds the transfer ought to be effected. And bearing in mind some unseemly scenes that occurred, yet through no fault of the authorities in charge, when the crypt was opened to the public for a while a few years ago, and it was thought that coffins and bones could be seen through an aperture in a wall built along the north aisle, we think this measure is a desirable one. The crypt should be cleared, and its proportions made visible in their entirety. The present church was built in 1723 by Bishop Gibson, of London, on the site of the choir of the Hospitallers' church, of which Hollar drew two views. It has lately undergone an extensive repair, both within and without, under the directions of Mr. John Oldrid Scott, F.S.A., architect. Mr. Harry Hems, of Exeter, executed the panel, in wood, for the west door, bearing sculptured figures of St. John the Evangelist, St. John the Baptist, and St. John the Almoner, the Knights' patron and tutelar saint.

* See also the *Builder* of October 7, 1854, and July 1, 1870, with illustrations.

THERE appears to be a good deal of new architectural work in progress or in immediate prospect at Hamburgh. There is to be another large block of law courts erected at a cost of about 25,000*l.*; a second municipal hospital of the Eppendorf type with some six to seven hundred beds, and the long-mooted new Central Railway Station, costing at least 600,000*l.* Of works in hand, the most important is, of course, the new Town Hall, which is gradually nearing its completion. It was generally thought this block would look very out of place on its limited site next to the Exchange, but now the scaffolding is down the effect is far more satisfactory than was anticipated. The headquarters of the extensive Customs Deparment of the city is now nearing its completion, and the new prison is practically finished. The new slaughter-house, which cost the Municipality 200,000*l.* has been opened, and the new crematorium is now being used.

THE *Vereinigung Berliner Architekten* has just issued invitations to the congress for "Protestant Church Architecture." The work "Protestant Church Architecture from the Reformation up to the Present Time" was issued by the Society last year in preparation for the congress which is to hold its first sitting on the 24th or 25th in the new church on the Gensdarmenmarkt. There will also be an exhibition of designs for Protestant churches.

A REUTER'S telegram from Athens (dated Sunday) announces fresh discoveries at Delphi. Fresh sculptures come to light day by day. The most important of these is a frieze said to be from one of the numerous Treasuries, and it is conjectured from that dedicated by the Siphnioles. The portion discovered is 17 mètres in length, and represents a procession of horsemen and chariots, seated gods and goddesses, and a gigantic machine. The analogy of a portion of the subject to that of the Parthenon frieze will lend it special interest. Moreover, it is reported to be a very fine specimen of early Attic work. A small pediment of similar style has also been found, and contains a representation of the essentially Delphic subject of the contest between Herakles and Apollo for the tripod. A number of very early reliefs are also reported of porous stone, and interest from their primitive style as well as their subject. Pausanias tells (x., 11., 2) how the island of Siphnos had gold-mines, and the god wisely bade the inhabitants send tithes to Delphi. They built a Treasury, but in niggardly fashion after a time forgot the tithe, and the god sent the sea to sweep away their mines. He unfortunately gives no account of the sculptures that decorated the Treasury.

WE wish some of our friends who send us such things as descriptions of buildings illustrated, &c., would kindly endeavour to write "English as she is spoke," or as written according to ordinary literary rules, and not what we call "specification English." The essential characteristic of this latter form of writing, in which too many architects indulge, consists in the omission of the particle "the." This is all very well in specifications, which are a kind of summary or schedule of work to be done, but it has a most objectionable effect in a journal, which ought to be written throughout in proper literary style, and we never will admit such writing into our columns. But to avoid this we often have to fill in the word "the" twenty, thirty, or fifty times in an architect's MS., or in the proof when it comes before us; and we object to this waste of our own and our printers' time in turning "specification English" into literary English.

ARCHITECTURE AT THE ROYAL ACADEMY.—II.

HAVING noticed in our first article some of the most prominent and important drawings in the Architectural Room, we may now proceed to notice, in the order of hanging, such of them as present anything for special remark, commencing with the first drawing in the room, the perspective view of the "Scheme for covering in the Great Roman Bath, at Bath" (1,512), by Messrs. Baggallay & Bristowe. The drawing shows large massive square pilasters carried up from the bases *in situ*, supporting an entablature breaking round the pilasters (or rather, square columns), with a statue above each, the room being covered, over this, with a coffered barrel vault. Between the square columns the space is divided into two heights by an entablature with flat columns over it. The general effect of the whole is fine and monumental in character, and completely suitable as the covering to the ancient Roman bath. With this we may take Nos. 1,519 and 1,520, exterior and interior of "Additions to the pump-room buildings, Bath," being the perspective views illustrating Mr. Pyrdon's successful design submitted in that other too celebrated competition. The exterior is a well executed pen-drawing, the plan and elevation of which we have already published. The building, with its dome and apse, groups very well externally, and is quite in keeping with the architectural character impressed on Bath by the works of Wood. The interior perspective shows the room under the dome; the dome being carried on coffered arches rising from an entablature and an order, and with an apse and semi-dome at each end, with the order continued round; at the end facing the spectator the wall below the semi-circular entablature is flat, the columns which carry the entablature standing out from it. The drawing is somewhat roughly executed, but the effect of the whole is fine and dignified.

"Jardine Hall, Dumfriesshire" (1,521), by Mr. S. J. May, is the drawing of which we published the view and the architect's description in our last issue. This is a geometrical drawing with a large plan, of a kind of which we wish there were more in the Architectural Room. A small-scale plan and elevation show the house as it was before the additions. As will be seen on referring to our last number, the old house was a simple parallelogram cut in two lengthways by a corridor, and with external flights of steps from the front yard and from the garden in the rear. The outside staircase in front has been transferred to the interior, and on its site a lower hall and a carriage porch have been built. The garden stairs remain as they were, but the circular drawing-room bay to which they formerly led up has been replaced by a square termination forming the garden front of the hall. As far as we can gather the effect of the garden front from the plans (for no elevation is shown), we should rather regret the removal of such a feature as this large semi-circular bay, which might, we should have thought, have been retained as a semi-circular colonnaded porch. The principal staircase is formed where a bedroom and a small stair formerly stood, and the longitudinal corridor is carried through the old walls and connects the new drawing-room and dining-room, placed at the opposite end of it, and separated from it by vaulted ante-chambers. The effect of this vista through two ante-rooms and two lengths of corridor, and across the central hall in the middle, ought to be very fine and effective, but the march from the drawing-room to the dining-room is a pretty long one (nearly 115 ft.), and would require a very large company to appear to justify its length. The drawing-room and dining-room are placed with their principal length at right-angles to the corridor, and the building is continued back in two wings, that behind the dining-room including smoking-room and billiard-room, and that behind the drawing-room a plant-house, gallery, and terrace. As an expansion of an old and cramped place into a spacious one of symmetrical and palatial character this is an admirable example of planning, and might well have been hung lower so that the details of the plan might have been studied, which cannot be done as it hangs; our own remarks upon it are based on the lithograph in our pages. Architecturally the centre of the house, which is one of the plain frigid Classic mansions of the earlier part of the century, is left as it was, and the side additions are necessarily in keeping with it: but the plan is worth attention.

"New buildings, Norfolk-street" (1,522), by Mr. John Dunn, is a fair specimen of new business buildings, but we cannot see the architectural propriety of diversifying a street front by hanging pilasters, as it were, on the upper part of the wall, which are projected on corbels and have no foundation in the lower portion of the structure. It is a misuse of an architectural feature. The same architect's "Premises in Arundel-street" (1,540) are much superior to these, and the pilasters here have pedestals to carry them; of course, as the ground floor in this case is not shops but offices, the difficulty of treating the front architectually is not so great. This is a respectable piece of street architecture, and a certain breadth is given to it by the grouping of the three upper stories of windows under large elliptical wall arches.

The "Small House at Brentwood" (1,525) by Mr. E. A. Hill, is a couple of elevations and a small plan, which is noticeable for the elegant way in which the circular porch is introduced, half in and half out of the wall. The porch is treated in a semi-Classic manner, and decorated with the little colonnettes on the upper part of its wall. The plan, which is L-shaped, is a well treated one for a small plan, and the elevations are picturesque and characteristic.

"Proposed Church at Portsmouth for the Winchester College Mission" (1,526), by Mr. Joseph H. Ball, is an interior view in monochrome water-colour, with a heavy but effective tie-beam roof treated in a decorative manner. The columns and arcade are of Romanesque proportion, but with Classic capitals. The walls show a large amount of decoration in figure subjects and ornament; we do not gather how these are intended to be executed, whether in painting, sgraffito, or other methods, but the general effect in the drawing is good, and the church, if carried out as shown, promises to be of some interest.

"Garden Front of a House at Enfield" (1,527), by Mr. T. W. Cutler, has a certain special character from the employment of the three low half-timbered gables in a row, with semi-octagon bays below the two end ones, and a solidly built round-arched doorway in the centre.

The drawing of the "Marble Staircase at the Glasgow Municipal Buildings" (1,532), by Mr. W. Young, is a striking water-colour drawing and shows the effect well, but the architectural effect seems to reside more in the richness of the materials than in any special quality of design.

"Municipal Buildings, Rotherham" (1,333), Mr. R. J. Lovell. The angle portion of this building, which is L-shaped, is effectively treated, and gives the "municipal" character to a comparatively small building of its class. The side portions are rather deficient in character and originality.

"Village Club and two Residences at Warnham, Sussex" (1,535), by Messrs. Batterbury and Huxley, is a very pleasant bit of modern village architecture in black and white half-timbered work, the houses and club on opposite sides of the road, which forms the centre of the picture. Small plans are appended (without scales by the way), to which the only objection we have to make is that (in the club plan), if the smoking-room is desired to confine the smoke within its own limits, it should not have had two doors, one of them directly opposite the reading-room door.

"Billiard-room, Blawith, Grange-over-Sands" (1,536), by Messrs. Willink & Thicknesse, shows part of the decoration of a room in the house which was shown in a drawing in last year's Academy, and of which we published an illustration. It is a richly and effectively designed room, in a style rather more Classic in feeling than the exterior of the house would lead one to expect, but it is an effective room both in general aspect and detail, especially in the treatment of the ingle-nook and fireplace, the latter with a heavy semi-circular projecting mantelpiece decorated with carving. The scroll brackets under this do not look quite powerful enough for the weighty character of the mantelpiece.

"A Summer Cottage for the Undercliff, Isle of Wight" (1,537), by Mr. Victor T. Jones, is a good characteristic little plan, spread out into large circular turrets at the angles, which however should have been distinct in treatment, as one of them is a bay out of the drawing-room, the other is a staircase. In other respects the plan is well-arranged, and the small house has a distinct character of its own.

The "New Conservative Clubhouse at Glasgow" (1,539), by Mr. R. W. Edis, accords with its name, for it is very conservative in style and treatment. A certain local character is given to it by the introduction of corbelled-out turrets after the Scottish manner.

"The New College-street, Gloucester" (1,543), by Mr. F. W. Waller, is an effective view of a new street of houses or shops near the cathedral. The drawing is executed in sepia in a rather loaded manner, which suggests rather than shows the detail, and, as far as we can judge, the treatment is not one we feel very much sympathy with; but with the cathedral rising behind, and the south porch seen facing the end of the street, the whole makes a pleasing architectural picture.

Messrs. Kidner & Berry's "Stables and Entrance-lodge, Bisham-on-Thames" (1,546) is a good specimen of the picturesque treatment of stables in a simple manner, with a low wall and high-pitched roofs. There is no plan.

"Welburn Hall, Kirby Moor Side" (1,548), by Messrs. Demaine & Brierley, seems to have taken its inspiration from an old Jacobean-house, or is it in part an actual old house added to? There is nothing to show. There are mullioned windows with a small order of Classic columns alternating with them; the same order is continued round in a quadrant as a passage to an out-building on the left of the picture, apparently a summer-house. It is an attractive and pleasing bit of building of its kind.

"The New Public Offices and Technical Institute, Leyland" (1,549) by Mr. Tulloch, is a perspective (without plan) of a building of free Classic tendencies but with rather curious detail, which seems too manifestly prompted by the desire to be original; heavy archivolts with hood-moulds which curl up at the end, springing from large pieces of cornice balanced on small pilasters. The author has done much better things than this, and we would rather he returned to his old manner.

"The New Nave and Tower of St. Peter's, Bushey Heath" (1,541), by Mr. James Neale, has no plan, but is apparently a nave with narrow side-aisles for passage only, and the buttresses carried over the aisle. Wall-arches in the clear-story spring from the gables of these buttresses, beneath which are circular clearstory windows with geometric tracery. The tower (south-west) is rather peculiar on plan, being a parallelogram longer in the east and west direction than in the north and south, and with a heavy lantern story with a steep roof over it. The whole is rather heavy in appearance, but otherwise is a somewhat original and effective building.

THE ARCHITECTURAL ASSOCIATION:

PRACTICAL HINTS ON THE WORKING OF WROUGHT-IRON.

AN ordinary meeting of the members of this Association was held on the 11th inst., in the meeting-room of the Royal Institute of British Architects, Mr. E. W. Mountford (President) in the chair.

The following gentlemen were elected members of the Association, viz., Messrs. R. Anson, N. M. Doncaster, E. H. Rouse, A. B. Venables, W. J. Walford, and F. C. Young.

Votes of thanks were passed to Mr. Fellowes Prynne for allowing the members to visit All Saints' Church, West Dulwich, on April 28; to Mr. J. L. Pearson for allowing the members to inspect the new church at Maida-hill, on the 5th inst.; and to Mr. W. D. Caröe for conducting the party over the church.

Votes of thanks were likewise accorded to Mr. Earle, Mr. E. Howley Sim, and others, for the entertainment at the members' soirée on the 4th inst.

It was announced that the annual dinner would take place at the Holborn Restaurant on the 31st inst.

Mr. Goldsmith (Hon. Sec.) read the House List, as already published in the *Builder* for May 5, page 343.

A letter was read by the President from the Committee of the Discussion Section, nominating Messrs. A. B. Pite and F. G. F. Hooper as Vice-Presidents, in addition to Messrs. A. C. B. Booth and A. W. Earle already nominated.

The following gentlemen were elected as scrutineers for the ballot, viz., Messrs. C. H. Brodie, E. W. M. Wonnacott, E. Greenop, and H. M. Wakley.

Mr. Henry Longden then read the following paper, entitled "Practical Remarks on the Working of Wrought-iron," with examples:—

Wrought-iron is one of the most useful and necessary materials which the needs of man have discovered. It has been used from early ages, and its widespread use is easily explained from its strength in proportion to its bulk and its cheapness. It has been used for railings, screens, balconies,

balustrades, chains, anchors, cramps, stanchions, chests, all kinds of supports, implements for use about fires, hinges, locks, window-fastenings, and numberless other uses which would be tedious to recapitulate.

The material, too, is one which has to be worked with heat in all genuine smith's work, and it requires strength of arm, sureness of eye, dexterity of hand, and great judgment. A little over-heating in the fire, a little over-hammering, and the metal is spoiled, and the work has to be done over again. There is something fine, strong, and masculine about good iron-work, and each curve, swell, or play of line in a piece of forged work has to be got by good hard blows which the finished work expresses to the mind, although the observer may not know what effort has gone to produce the result he sees.

The iron is now bought from the manufacturers in bars or rods, and, in this material especially, quality is of great moment, as iron work in connexion with architecture has usually some office to perform in which strength and lightness are both sought for; the quality of the iron should be looked to, as inferior iron has neither the strength nor the power of resisting the destructive effect of the atmosphere which good iron has. There is a point, too, which causes much difference between old and modern work, in the regularity of the making of the iron bars or rods. In old times these were drawn out on the anvil from lumps of iron, and now they are rolled between what are called "rolls" of iron with grooves turned in them. The hot metal is made to pass through the rapidly-revolving "rolls," and a bar 12 ft. ong will be quite of the same section and size from end to end, whereas the bar made by the old process would be irregular in thickness, which, in certain kinds of work, adds charm to the design. I have found it necessary in some work to heat and hammer the bars to give them some of the irregularity of surface of the old work.

Before beginning his work the smith takes his bar of iron and examines it, springs it by shaking it, and tests it generally as to soundness and quality. For bars in railing the iron has to be looked along to see that it is out of twist and straight. The smith then heats the bar in the fire and brings it to the anvil, on which he may work it alone, or with a "striker" or "drummer," or with more than one if the work is heavy. The smith directs the "strikers" with his hammer, which is a lighter one, how and where they are to strike with their heavier hammers, and he can indicate the force of the blow he wants. The working together of two or more men on the glowing mass of iron drawn from the fire, the perfect understanding without words which they show, and the shaping from the bright red mass of the object to be made, passing through cherry red to dull red, and finally to a grey blue, is one of the pleasantest things I know to witness. The tractability of the material and the way in which a fine and delicate object can be made out of a rough mass, with almost no waste of material, is a great lesson in the superiority of mind over matter. I know of no material which exemplifies this, in a large way, so well as iron.

If a bar or rod is to be used in railing, with a head, a thicker piece is welded on to the bar, and it is drawn down with the hammer to a taper shape or to any other shape that is required by the design. Where the heads are drawn smaller and there is great repetition, a "swage" or "stamp" is made, which makes them more readily and makes them all alike, which is the more economical but less artistic way of doing the work. In St. Helen's Church, Bishopsgate, after the numerous changes and sweeping away of monuments, there are some good examples of this kind of work, notably round the tomb of William Kerwin, where very light iron, only $\frac{5}{8}$ in. square, set angleway, is made into a close railing, the heads are of various lengths, and the forged collars and finishing knobs at different distances in the heads, yet the effect is good and free. Sir Julius Addiman's tomb-railing, of which I made notes in 1890, appears to have gone. This was a stronger railing, still very close, and with fine twisted corner pillars, made of four $\frac{5}{8}$-in. square bars twisted together, with square moulded caps and bases, and long twisted pinnacles finishing with balls.

The mode of making the rails, or the long horizontal bars for railing, varies much, and the effect to be got by these is worth consideration in designing railing. The simplest and cheapest way is to take the ordinary flat bar and punch out the holes by machinery. This is almost of necessity the plan used for large quantities of railing, on account of cost, and the holes punched may be square or round. When the work is smaller, as in internal grilles or small gates, the effect of swelling out the rails with round swells to suit round bars, or with swells for square bars, set either square-way or angle-way, is richer. The perspective, in which we really always see this kind of work, is much enriched by the breaks in the horizontal lines, and the extra cost caused by swelling out the rails is found to be well bestowed in greater elegance of effect. The rails used in this way need not be so large, as, when straight flat bars are used, the width of the iron must be enough to allow of the holes being punched without danger of bursting out the iron on each side of the hole. . . .

The effect of square upright bars set square-way or angle-way is also worth considering in designing railing and grilles. The perspective in which one sees them has the effect of making the square-way square bars look the richest, as you get the two sides wherever you see the railing. When the square bars are set angle-way you may see practically only one side, and the effect is poorer, though the diagonal projections in the rails make a kind of decoration. The round bars have a pleasant softness of light and shade, but where strength of effect is wanted square bars are to be preferred.

For gates strength in the frame-work and staying with horizontal lines is essential. In the way of treatment of the iron, the grain or the lamination of the metal in the length-way of the iron must not be forgotten. The bracket-piece I have here, which forms the end of a horizontal bar of a gate, with its tenon prepared to rivet into the mortice to be cut into an upright bar, looks a simple and straightforward piece of work, but it has taken a good deal of making. It is first made with a hole through it, the tenon is then rivetted into it, the way of the grain being the lengthway of the tenon, and then the remainder of the shoulder and the rail to form the horizontal bar is welded to this piece of work. I have known instances of smiths attempting to cut the tenon out of the solid lump, and so shaking the iron in the process that the grain was destroyed and the tenon fell off. If this does not happen the iron is weakened and that which should be one of the strongest parts of a gate, having to resist twisting, thrusting, and sagging, is not able to do its work adequately, and the gates will give way much sooner than they would if well made. . . . I may here say that hammer-made, as contrasted with filed-up wrought-iron work, should always be sought for and required. This remark applies to black work; where the iron work is polished, which is a very beautiful treatment for small and very rich work, the whole surface has to be filed and finished up with emery.

The treatment of iron in forming scrolls is one of the characteristic ways of working this metal, and one to which no other metal or substance with which I am acquainted will lend itself. The iron is taken of an agreed size, and is heated and drawn out, thinned, either spread in the thinning or kept to the same width throughout, and then rolled up entirely by the eye and the skill of the hand. There are steel templates made, round which these scrolls can be turned, but the result is, as might be expected, a dead uniformity and a loss of all life in the work. There are here examples of three ways of forming scrolls, of which each has merit. The more the iron is drawn out the closer it may be rolled up to look well.

These scrolls often spring from stems which are prepared with short starting-pieces, and the scroll is welded to the starting-piece, care having to be taken to make the welding places at such distances from one another that they are not too often heated in the fire during the weldings. The end of this stem is shown "scarfed," so that a bar can be welded to it without a diminution of bulk at the point of welding. The two bars to be welded are brought to a white-heat in the forge, are then laid together on the anvil, are brought by gentle blows of the hammer into their right places, and are then, by strong blows, firmly united, so that a good weld makes, of the two pieces of iron, one. This quality of the power, without any other substance being employed as solder, of making the two things indissolubly one, is a special quality of iron. The preparation for welding the scroll is done similarly to the piece with the leaf in the centre.

The forming of the forged leaves is an interesting part of the work. A blank is first made, which is well hammered. It is then hammered into a V-section. It is then worked further, serrated, the eyes cut, and modelled with the hammer, until you find a well-modelled leaf. This is a special branch of the work, and the fine, bold modelling requires much skill and practice. In much of the work done, both in older and more recent times, the leaf work is hammered out of thin sheet, and is then fitted with "checks" filed out of the main lines of the work, so that the thickness of the leaf shall not break the suavity of the line. The leaf is then rivetted on, and often brazed too, but that is not the best smith's way of doing work, and is not so enduring, as the thinner iron is sooner destroyed by rust.

There is here another piece of work in which the bar is drawn down and twisted at the top, and two leaves, forming a sheath, are welded on it. You can just see where the thickness of the leaves melts into the stem, and just this amount of variation in the line gives life and vivacity to the work.

I do not follow out this part of the work, as the fine beaten work in iron, black or polished, which can be done would lead me rather away from smiths' work, which is pre-eminently wrought-iron work.

Another treatment of iron is carving it. This kind of work lends itself well to grotesques. It was carried out in the Renaissance times with great delicacy and beauty, but while it will add interest to small works, it is too difficult to be worth doing, except in a small way, in a material which is so intractable, which is only another way of saying unsuitable, for the purpose.

The small quatrefoil is an example of welding, first of each trefoil point with the two branches springing out of it, and then of bending the arms and welding them together in the centre of each lobe of the quatrefoil. This work has to be done very accurately when these quatrerfoils have to be banded together to make sheets of work, but it may be done so that each quatrefoil has an individuality of its own, and that the dead mechanical uniformity which is the blight on so much modern work may be avoided.

There are intricacies of halving bars together, by which is meant filing out of each of two bars meeting one another mortices, so that when put one with the other, the two bars take up only the room of one, but this weakens the iron very much and is not to be recommended. It was principally done in work where a flat surface was desired and in later times.

Twisting iron is another characteristic treatment. It is to be remembered that a twisted square bar takes more room when twisted than when plain, and it cannot, therefore, be passed through the hole which would take the plain bar; but it is possible so to reduce the bar to be twisted as to make it very little if at all larger than the plain bar. When twisting is done in large sizes of iron this reducing before twisting must be done, otherwise the twist looks coarse. Twists of 2, 3, and even 4 strands may be done, and in some of the late Mediæval work a good effect was got by grooving the iron bar and then twisting it. There is a good example of this in the Ante-Chapel of St. John's College, Cambridge. Round rods of small size can be welded together and twisted—indeed, a small form of this, swelled out in the centre, has become a commonplace in the shops, and is, as always in such cases, greatly misapplied. I have seen it used as short pillars in a fender, while the very reason for it is either that it is wanted to relieve what would otherwise be a dull length of bar, or as a termination, like a handle. It is one of the small clevernesses which are easily overdone.

The setting out of ironwork for staircases where there are curves and vamps is difficult; and a running pattern, rather than one which sets out in panels or smaller repeated parts, is to be avoided. The difficulty can be overcome, but the result does not seem to be worth the trouble required to attain it.

Mr. Longden then referred to some examples of old and modern work as exemplifications of points he had named.

A grave cross, a piece of Swiss work, probably of the seventeenth century, showed welding and scroll-work, split at the ends, moulded and spread out into ram's horns in a manner very characteristic, he said, of late German and Swiss work. It was too florid in style, but was a marvel in its way.

An oblong panel, also a piece of Swiss work, was noticeable for the fine design of its main lines, and for the way in which the iron is beaten out thinner from the main thickness, is formed into leaves, then goes on again as flat iron in a reduced form, and finally finishes in a leaf and a sharp point. The thistle suggestion was here very plain, but the thistle was nowhere so used as it

become naturalistic; it always keeps within the bounds of ornament. . . .

A panel of Mr. Sedding's work was exhibited, which was made purposely with great irregularity in the scrolls and in the ornaments. "The only binding points in this work," said the lecturer, "are the points of contact of the scrolls, and a general similarity of shape in the scrolls is kept, but after that the smith was left quite free to form the work to his fancy. Looked at in the full-face way it looks very irregular; but, if you were to see this work forming a side-screen to a chancel, where one of our best late architects had had the chancel-screen made in an admirable manner of strict regular Mediæval design, you would see where the life was in the iron-work.

The panel with two large roses is a piece of Mr. Sedding's work for Holy Trinity Church, Sloane-street. It is an epitome of that work, which he said was the best iron work he had done. In its abundance of line, in its profusion of ornament, and yet in the subordination of the smaller to the principal parts, it is a good example of Mr. Sedding's work. The screens at the side of the chancel steps are of plain bars with a wonderfully curved and ramped capping; and up the centre of this comes a free undulating stem, which rises above everything and bursts out into sprays and blossom, as one has seen a bunch of wild rose rising up out of a hedge. Only a master like Mr. Sedding could do such daring things, but he justified himself by his work. . . .

Much iron work is being done now, more than has been done for many years past, and there is a plethora of the pretty and meaningless work. I was sorry to see at an exhibition promoted by the Blacksmiths' Company lately very little work which I should consider really smiths' work. Fire-screens, lamp brackets, and other small things, were the staple of the exhibition, and florid, meaningless ornament was abundant. It may be that in a room it is difficult to show important pieces of work, but in only one or two cases did I see any indication of feeling for wrought work, by which I do not mean thin iron, bent cold into intricate forms, but work formed in the manner I have before described. This kind of work lends itself to making combinations of scrolls, flowers, &c., of stock sizes, and we are now offered flowers, leaves, bosses, and other ornaments wholesale. I need scarcely say here that this is not the way to good work, and that the work of old times, which we study and admire, and on which we found our own work, without direct copying, of course, was not done in this way.

There is great fashion in these matters. I remember when Gothic hinges, often of very fine design, handles and certain screens in cathedrals were the only iron work made. Now I am sorry to say that the making of hinges is less in fashion than it was. In the making of a hinge which clasped both the front and back of a door, with the knuckle thrown out to suit the pin, which is fixed in the stone-work, and the work in front of the door well drawn out, thinned down and hammered into ornamental form, is one of the best tests I know of a good smith. There are still fine screens made, but the domestic use and the ordinary use of iron-work has so increased that no skilled man should want employment.

If architects will require good work they can get it, and the understanding of the points of iron-work practically is much greater than it was some years since."

Mr. Arthur Keen, in proposing a vote of thanks to Mr. Longden for his paper, said, in talking to an architect the other day, he was told that the craze for wrought-iron work was rapidly passing away, and that people were getting tired of it. He thought that perhaps that was so with regard to the ordinary shop article, and it would be as well; but they might rest assured that, as long as iron-work was well made, and intelligently designed, people would not easily get tired of it. Mr. Longden's paper was particularly interesting, because it was a description, almost all through, of methods of doing work. It was exceedingly valuable for them, as architects, to be told how the work was done—whether brick-work, wood-work, or metal-work; and what they most desired was to find out the methods of doing it. They had often to keep their work exceedingly simple, and they must get what effect they could out of natural applications of the ordinary methods of work. In looking at old cottages and houses, and domestic work especially, they would find its charm lay in its being done in a perfectly natural way, with no ostentation or strain about it; and if they did the work in the same spirit, he believed the same effect would be obtained. Builders must often have considerable difficult in doing the architects' work now-a-days, because it was frequently designed in a wrong manner; while, if the work was designed in the right spirit, the effect could be obtained at half the cost, and was really much more pleasing. On the chateau of Amboise there was a balcony with a wrought-iron front, which was most simple and effective, and he ventured to say it would not cost half as much as many modern balconies which were not nearly so effective.

Mr. W. H. White seconded the vote of thanks, and agreed with the last speaker, that it was to methods of work they should look for help in designing. He would like to call attention to the old work in the squares of the West End and the West Central district of London, which was rapidly disappearing. With regard to iron-work generally, he believed, if the old examples were studied more, there would not be so much meretricious work seen nowadays. He had been very much struck in Essex with the old signs and little bits of wrought-iron work, and a sketch-book could be soon filled with many charming specimens.

Mr. E. Greenop said, in listening to Mr. Longden's paper, there occurred to him the beautiful examples to be found in the South Kensington Museum. As to the work which was hammered cold, and of which Mr. Longden had spoken disparagingly, he believed it had got to such a low ebb that it had been adopted by young ladies as a sort of drawing-room accomplishment. At the same time, it occurred to him, looking at Mr. Sedding's beautiful panel which they saw before them, that some of the leaf-work had been done in the cold state, and possibly even pinned. It might be want of taste on his part, but, with all the admiration he had for Mr. Sedding, he must say that the old Swiss panel exhibited pleased him more than his elaborate design.

Mr. H. A. Satchell endorsed what had been said about the advantage of having practical papers read before the Association. He hoped that Mr. Longden in his reply would be able to indicate to them briefly the way in which they could get effect at little cost. He would also like Mr. Longden to give them the results of his experiments in the protection of wrought-iron, for it was a pity to see so much of the modern work perishing, especially where it joined stone bases.

Mr. H. W. Pratt remarked that he was glad to hear a condemnation of elaboration in wrought-iron work, the tendency now being to over-elaborate. A reference had been made by one of the speakers to signs, but a great many of these seemed to be overdone. At the same time, he spoke with some diffidence, as many of these signs had been designed by eminent architects. One felt that the work put into these signs must be thrown away to a great extent, they being so much above the eye, besides getting choked up with dust. If a little more attention were only paid to simple forms, and an endeavour made, in designing the iron-work, to keep before them leading lines, and a scale of size in the metal, the result would be much more satisfactory. One got a little tired of seeing scroll-work all in the same relation one to another, the same sized bar being used over and over again, for in this way it was impossible to get sufficient relief to mark the design, and to give it character. With regard to iron railings, there was room for a good deal more treatment in the way the upright bars were finished; and if they would only adopt the simple methods shown them that evening, the result would be very much more effective and attractive to them as architects, even if it was not to the public. There was no doubt that the largest amount of metal-work now done was in connexion with domestic, rather than with church work, always excepting screens in churches. He had noticed also that the elaborate work, in the way of hinges on church doors, had, within the last few years, very much diminished. He supposed it was caused by a sort of reaction, the method having been a little overdone, and it having been imitated to some extent in cast-iron work. At the same time, it would be a pity to permit a legitimate method of design to drop out. It was a method of design and detail which came close to one's eye, and one was able to appreciate the work, while it was a very effective treatment for a doorway.

The President remarked that, in hearing a paper like that by Mr. Longden, it was impossible to add much to what had been said, but he had hoped that more questions would have been asked. Mr. Longden's paper was the sort they were always endeavouring to get; they did not care so much for the historical aspect of things, as to know how things were done. In looking at cheap work, one saw at a glance that it was "cheap and nasty," and the imitation of wrought-iron work which builders were so fond of doing in cast-iron, was particularly abominable. He agreed with what Mr. Greenop had said, for, much as he admired Mr. Sedding's work, he could not help feeling that in the panel shown that night, he had carried the use of iron beyond its proper limits. The material had its limits, and when one tried to reproduce, as Mr. Sedding had done, the actual forms and growth of leaves and flowers, it seemed to be going outside the proper use of the material, and suggested a German rather than an English origin. It was a useful thing to be told, as they had been that evening, about iron bars, because that was the sort of railing that most of them dealt in. He had had a good deal of it done the other day, and was much annoyed to find the bars flaking, so much so that he picked pieces half an inch square off the edges of the bars. In fact, he told the makers that he did not believe it was wrought-iron, and having condemned it, he found out afterwards that these bars were made by the mile at Birmingham. He could not agree with what Mr. Longden had said as to the superiority of square bars in perspective over angle bars. Whenever he was doing that sort of thing, he always put them angle-ways; it was infinitely prettier, and had the advantage of making the bars look bigger, so that the client, when paying for 1-in. bars, thought he was getting 1¼-in. bars. Then, again, the resistance of an angle-bar would be greater than that of the same bar set square, and when one was reduced to having to calculate the strength of the bars, this was an advantage. The question of the preservation of iron was a matter of great importance, and he would like to ask Mr. Longden if he had heard anything of a process produced some years ago for enamelling wrought-iron? No doubt everyone had noticed the way in which wrought-iron bars were eaten away close to stonework, and he had always understood it was caused by the chemical action set up by the contact of the lead and the iron. This might be overcome by using sulphur for the setting of the bars. Another important question was as to how thick the bars should be made. In the case of architectural scroll work, and things of that sort, it was especially difficult to know how thick to make the scroll work, when it was to be placed about 50 or 100 ft. from the ground. Much of the modern wrought-iron work looked too fine when at any height from the ground, and the same mistake was constantly made, even by the best men, in the case of such things as church screens. He had, in fact, seen screens, designed by architects of eminence, whom he dare not name, where the metal-work was so fine, that one hardly realised the screen was there, and there appeared to be no object in having it in that position at all. The old men did not do such kind of work, and even the later Renaissance work was more solid than anything we had in these days.

The vote of thanks was then put and cordially received.

Mr. Longden, in replying, said: As to the swelling of the bars on the balcony at Amboise, it was a beautiful way of getting a simple style of decoration. By swelling out the bars and making the swelling change in the two directions, an excellent effect could be obtained and an enrichment of the surface was thus got by the simplest means. With respect to the old iron-work about London, a great deal of it was extremely beautiful and valuable, notably in such places as Grosvenor, Hanover, and Berkeley-squares, and in the Bloomsbury district. As to the skill of the workmen, if they got a good plain smith and knew how to tell him what was wanted, there was no doubt he would do it. At the South Kensington Museum there was a most valuable and wonderful collection, but the gallery over the court was nearly always dark, so that the objects were seen with difficulty, and then nearly always in *silhouette*. With regard to the specimen of Mr. Sedding's work, he was not quite unbiassed. It had been found fault with for being too florid, but there was no "fudging" about it, and, speaking with all deference to the judgment of the gentlemen present, he considered it a beautiful piece of design. Swelling the rails in a small piece of work cost little more, though if carried out in a long piece it would cost a good deal more. The best thing for the protection of iron work was to soak it, while it was "black" hot, in oil, at the forge, and then paint it well. He had never heard of anything which could take the place of

good oil-paint for protecting iron work. The enamelling process he did not know of, but anything of that nature suggested a glazed surface, and that to any extent, in the case of iron, would not be agreeable. Galvanizing was, no doubt, a protection, but if it began to scale it would come off, and he believed, after all, that plain honest oil-paint was the very best thing to use. Reference had been made to iron decaying where it was set into a stone base, and he knew the case of a railing where strong bars were made of wrought-iron and lighter ones of cast-iron, the whole being let into a stone coping. The result was that in about eighty or ninety years' time the wrought bars were eaten away, so that they were no thicker at the base than a lead pencil, while the cast-iron bars were just as good as when put in. The explanation was that the bars were let in with lead, which had set up a chemical action and eaten the iron away. If such work was fixed with sulphur or good cement it was the best way of fixing it. There was no doubt that much work was over-elaborated; and the commonplace work to be seen now-a-days without a leading line in it was absolutely loathsome. As to the dying out, to some extent, of the making of hinges, he believed a good deal of that arose from the change in the character of church work. Everybody was aware that, in the fifteenth century hinge-work, practically, went out, and if people built in the later styles hinge-work would naturally disappear. The dreadful cast-iron hinge-fronts, too, had thrown a certain stigma on hinges. A remark had been made as to the flaking of the bars, which must have been used as they were sent out of the rolling-mill. No bar should leave the forge without being hammered over, and properly put through the fire. With regard to the position of the bars, angle-ways or square, he would bow to the President's opinion. In dealing with work which had to be placed 50 ft. from the ground, everything should be twice as big. The size of the works as placed near the ground should be doubled in bulk, and in design, and this would give about the equivalent effect. Though ironwork might be gilded and coloured, it was a great error to gild it all over in most cases. Mr. Sedding liked ironwork of extreme thinness, and sometimes he (the speaker) had found much difficulty in getting what was wanted. He recollected Mr. Sedding wishing a screen made of plain rings banded together, of extremely light iron, but the effect in the church was very beautiful.

The proceedings then terminated.

THE CONGRESS OF HYGIENE.

WE take from the official programme of the Congress of Hygiene, to be held at Budapest, the following list of papers to be read on the subject of the Hygiene of Dwellings:—

IX. SECTION.

THE HYGIENE OF PUBLIC BUILDINGS.

1. *Baer, A.* (*Berlin*). Reformbestrebungen auf dem Gebiete der Gefängnissbauten.
2. *Campanakis Patrocle* (*Constantinople*). Des plans et devis de quelques idées basées sur l'hygiène pour des édifices publics en général.
3. *Fellner, Ferdinand* (*Wien*). Feuersicherheit der Theater.
4. *Fischer, H.* (*Hannover*). Heizung, Ventilation und Beleuchtung der Theater und Sitzungsräume.
5. *Griffith, Major A. M.* (*London*). The Hygiene of Prison Cells.
6. *Leyden, E.* (*Berlin*). Die Spitalsversorgung der tuberculosen Kranken seitens grosser Städte.
7. *Ney Béla* (*Budapest*). Színházak tüzbiztonsága.
8. *Renk Friedrich* (*Halle*). Indirekte Beleuchtung in Auditorien.
9. *Rózsavölgyi* (*Budapest*). Nagy városokban iskolák csoportositásának és oktatásra és testedzésre kihasználásának kérdése.
10. *Schrötter, J. Ritter v. Kristelli* (*Wien*). Spitalsversorgung der tuberculosen Kranken seitens grosser Städte.
11. *Wolffhügel Gustav* (*Göttingen*). Die Wahrung der Reinheit der eingeleiteten Luft uud die Assanirung der Luft bei Centralventilation.

X. SECTION.

THE HYGIENE OF DWELLINGS.

1. *Cacheux, Emile* (*Paris*). Système des maisons de rapport et des maisons de famille, au point de vue des intérêts hygiéniques et financiers.
2. — L'influence du logement sur la santé des habitants d'une grande ville.
3. *Corfield, W. H.* (*London*). Protection of dwelling-houses against sewer-gas. The control of escape of the sewer-gas.
4. *Galton, Douglas* (*London*). Central heating of dwelling-houses and whole towns.
5. *Gruber, Franz* (*Wien*). Systeme der Wohnhäuser für die minder bemittelten Classen der Bevölkerung.
6. *Recknagel, G.* (*Augsburg*). Zweckmässige Ventilation der Privatwohnungen.
7. *Trélat, E.* (*Paris*). Chauffage central des logements dans les maisons de rapport et dans les villes entières.
8. *Weyl, Th.* (*Berlin*). Ueber ein neues Feuercloset.
9. *Zavitziano Sp.* (*Constantinople*). Les cabinets d'aisance.

The section on the "Hygiene of Towns" is too long for us to quote. The English contributors to the list are Mr. de Courcy Meade, "Practical Ventilation of the Sewers in Towns"; Mr. R. E. Middleton "Technical Results of the Establishment of Drainage Works in Large Towns," and "Technical Results shown by Water Works Established in Large Towns," both papers dealing with the period of the last ten years; and Mr. W. R. Smith, "Effects of Filtration on Drinking Water."

The fee for membership is ten florins for gentlemen and five florins for ladies. The membership ticket, which will be sent to everyone who has paid the fee, will secure certain reductions of railway fares. The Secretary-General, to whom fees are to be forwarded, will give information as to hotels and lodging as far as possible, and members of congress are advised to bespeak hotel-room beforehand. A list of hotels recommended can be obtained from the Secretary.*

The following is the list of attractions and entertainments proposed in connexion with the Congress:—

A) The Corporation of Budapest as the host of the members of the Congress, will arrange for their guests an evening-party in the edifice and gardens of the National Museum, for the purpose of introducing the members to each other.

B) The Corporation will also arrange a reception-soirée in honour of the members, in the halls of the Town-Redoute.

C) At the Royal Opera House, the National Theatres, and at the People's Theatre, festive representations will be given in honour of the members of the Congress.

D) September the 6th (Thursday) being reserved for a day of rest, the members will have an opportunity:

1. to view the public buildings, hospitals, establishments, sanitary institutes, factories, &c.
2. On this day the members may make excursions.

a) to Totis, the seat of Count Nicolas Eszterházy, who invites them there.
b) or to Balatonfüred,
c) or to Siófok on the Plattensee,
d) or to the Heights of Buda,
e) or to the Margarethen Island, where the XV. Section—sport, etc.—will arrange a regatta, etc.

E) On two evenings the Section of Sports arranges athletic, gymnastic, and cycling competition productions.

F) The Corporations and Societies interested in the Congress will also arrange reception soirées in honour of the members.

G) On the other evenings the Hungarian Presidents and honorary Presidents will entertain the members.

H) After the closing of the Congress the following excursions are contemplated:—

1. Excursion to Belgrad-Constantinople.
2. Excursion to Belgrad-Hercules-Bath.
3. Excursion to Mezöhegyes, the Hungarian State Farm for Horse and Cattle breeding.
4. Excursion to the High-Tátra, Old and New-Tátrafüred and to the Icecave of Dobsina (eventually in connexion with a skating festival).
5. Excursion to Agram-Fiume-Abazzia.
6. Excursion to Bosnia and the Herzegovina.
7. Excursion to Pistyán.

For the reception, conducting, and entertaining of the lady-members of the Congress, a special Committee has been formed, of which Mrs. Polixena Pulszky-Hampel is President. There seems every intention at Budapest to make the Congress a success.

OPENING OF PECKHAM RYE PARK.—On Monday Mr. John Hutton, Chairman of the London County Council, opened Peckham Rye Park, an additional open space adjoining Peckham Rye. The park has an area of 48 acres. The total cost of the site has been 51,000*l.* Towards this the London County Council has contributed 18,000*l.*, the Charity Commissioners 12,000*l.*, Camberwell Vestry 20,000*l.*, Lambeth Vestry 500*l.*, and St. Mary Newington and St. George the Martyr, Southwark 250*l.* each.

* The Secretary-General's office is at "St. Rochus Hospital, Budapest," up to August 20; after that it will be at "The Royal Joseph's Polytechnicum."

INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A LANCASHIRE and Cheshire district meeting of the members of this Association was held in the Town Hall, Chester, on the 12th inst., Mr. J. T. Eayrs, C.E., of West Bromwich, President of the Association, presiding.

The members on their arrival were received by the Mayor and Deputy Mayor of Chester, who extended to them a hearty welcome to the City of Chester; and the President suitably acknowledged the courtesy of the Mayor and Corporation in permitting the Association the use of the Municipal Buildings for the meeting.

The first business was the election of an Honorary District Secretary for the district, Mr. S. S. Platt, of Rochdale, who has held the position for nine years, retiring upon his election as a member of the Council.

The President proposed a hearty vote of thanks to Mr. Platt for his services as district secretary, and paid a very high tribute to the value of his services to the Association.

Mr. T. de Courcy Meade (Hornsey), who seconded, remarked that Mr. Platt had been the life and soul of the Association in the Lancashire and Cheshire districts.

Mr. Brierley (Newton-in-Makerfield) supported the vote of thanks, which was accorded with acclamation.

Mr. Platt, in acknowledgment, said that his interest in the work of the Association would not be lessened by his retirement from the office of district secretary, and whoever was appointed his successor, he should endeavour to give him every assistance in the carrying on of the work.

Mr. J. Cartwright (Bury) proposed the election of Mr. Button, of Burnley, as district secretary, in succession to Mr. Platt. He remarked that Mr. Button was very well known to the members, they had visited his works, and knew what he was doing. There was not a more enterprising engineer in the North of England or one who was making a greater mark.

Mr. Wellbourn (Middleton) seconded the proposition, believing that in Mr. Button they would have a very able and excellent secretary.

The proposition having been adopted,

Mr. Button, in acknowledgment, assured the members that it would be his earnest endeavour to carry out the duties to their satisfaction, and at the same time to help forward the interests of the Association.

Mr. Allan Greenwell, A.M.Inst.C.E., Surveyor to the Frome Rural Sanitary and Highway Authority, read a paper on "Steam Road Rolling." He said that the Secretary of the County Surveyors' Society had put the question to County Surveyors, "Have you any further information to offer as to the cost and desirability of road rolling by steam or otherwise?" and in a correspondence which appeared in the *Builder*, in connexion with the above question, a County Surveyor wrote as follows:—"Steam rolling cannot be defended on economy of cost. It saves by consolidation without abrasion or trituration one-eighth of the metal." These statements were illogical on the face, because if the cost of steam road rolling was less than one-eighth of the cost of the metal consolidated, economy at once results. Having noted the varying methods in which different surveyors calculated the cost of the work upon time, area, or quantity, he said there was much to be said for and against each method. The cost per day depended much upon the quantity of work performed in the time, so beyond a certain quantity an increase in the latter caused a relatively much greater consumption of fuel and heavier wear and tear, besides adding to the necessary horse hire for hauling water, &c., and the labour for sweeping. Again, if the cost was calculated at per 100 superficial yards, or at per cubic yard of materials consolidated, the quality of the stone, the thickness of the coating, liability to stoppages on account of traffic, and the relative area of the patches rolled must be taken into consideration. From personal experience the writer had found it to be more satisfactory to base his calculations upon the cost per cubic yard as enabling a more accurate check to be kept upon the work actually performed. In the calculations which he had made, the following items were included in the cost of steam-rolling engine-drivers' wages, sweepers' wages, horse hire for hauling water and landing, coal, oil, waste, and sundries, and depreciation and repairs of plant. The experiences were all in the Frome district during the last four years, and the stones used were blue rock or mountain limestone chert; tough blue sandstone (lower oolite), and grey limestone (lower oolite),

very little used. The steam roller, which built by Messrs. Aveling & Porter, weighed tons, and rolled a width of 6 ft. 3 in. The irs account amounted to 2¾ per cent. per um. The staff attached to the steam-roller prised the driver and two sweepers, one of om acted as foreman. During the financial 1893 (54 weeks at 52 hours per week = 2,808 rs) the roller worked as follows:—

	Hours.	Days.	Hours.
ctual work...	2,158	239	7
leaning out boiler and repairs	406½	45	1½
ravelling	245½	27	2½
topped through frost.....	75	8	3
olidays	36	4	–
t out on hire	7	–	7
	2,928	325	3

uring this period 165,329 superficial yards of were rolled, and 9,132 cubic yards of stone olidated, making a daily average of 689 rficial and 38 cubic yards. The stone was e up as follows:—

	Cubic yards.
Mountain limestone	6,869¾
Tough blue sandstone	1,592¾
Flints (chert)	689½
	9,132

he cost was as follows:—

	£	s.	d.	Rate per cubic yard consolidated. d.
ne driver's wages	63	6	6	1·7
epers' wages.....	78	6	4	2·1
se hire (hauling water d binding)	124	9	0	3·3
.....	54	9	0	1·4
bes, oil, &c.....	32	9	0	0·8
	352	19	10	9·3
eciation 10 per cent., d repairs 10 per cent. r annum	81	16	3	2·1
	434	16	1	11·4

areful observation had led the writer to ve that at least 25 per cent. of the material saved by steam road-rolling. The cost of m road-rolling a patch of mountain limestone t two stones in thickness, one mile in length, 21 ft. wide, was found to be 36*l.* 1s. 7d. e cost of coating was 189*l.* 11s. 8d., and under inary circumstances when consolidated by the ic alone would last seven years. making the per mile per annum 27*l.* 1s. 8d. The net it resulting from the use of the steam-roller was is. 4d., or 15 per cent.

Ir. Barber (Islington) in proposing a vote of nks to the author of the paper, said it was a elty to him to hear a paper read on steam-ng in rural districts. He was under the ression that there were few rural districts re a steam-roller was used. It would be quite ossible to compare the cost of steam-rolling in rural districts with town streets, where the mstances made the work extremely costly. own streets which could not be closed there e frequent vehicles passing along necessitating ment stoppages of the roller. He thought the class of stone used in the Frome district ton roller would be more suitable than a 10-roller.

Mr. Jones (Chester) said he had one of the new es of compressed double cylinder engine steam-ers, and he found there was not the throbbing disturbance in the air as with the single gine. There was also an economy of coal, and ing the short time they had had it their llest expectations had been realised.

Mr. Smith remarked that fourteen years' expe-ce of road-rolling had taught him it was a at mistake to buy the roller too light. With a t roller the cost of coal was the maximum and work done the minimum.

Mr. T. de Courcy Meade, said he had had steam-lers in use at Hornsey for fourteen years. He had present four rollers—one of 6 tons, two of 10 s, and the other 15 tons. His experience of the rk done by a 6-ton roller was very different m that experienced by Mr. Smith. The roller had did its work admirably, and at the present e he would prefer a 6-ton roller for rolling nts to one of 10 tons. He feared that the ures given in the paper, though very interesting rural districts, could not be applied in any way town streets. He had had a careful watch en in his district of the time the roller was at rk and the time it was standing, owing to the ssage of vehicles, and he found that not one-rd of the time was the roller engaged on the material; that showed how delusive the figures would be when applied to town districts.

The President, in closing the discussion, agreed that the figures would be very fallacious if compared with the work done in towns. The quantity of stone which could be rolled varied very considerably in almost every town. He found that on the average he could not roll more than 600 yds., not far from Chester, where they only did 200 yds. a day. The cost of his rolling was from a ½d. to ¾d. per yd.

The vote of thanks was unanimously accorded.

The members then visited Eaton Hall, the residence of the Duke of Westminster, and were permitted to view the mansion, the paddocks, and other places of interest. The arrangements made for the disposal of the sewage at Eaton Hall were inspected, after which

Mr. Albert Wollheim, A.M.Inst.C.E., read a paper on the Eaton and Eccleston Sewage Precipitation Works. He said:—

"The Duke of Westminster's estates near Chester, situated on the banks of the River Dee, are very extensive, and comprise, besides the world-renowned Eaton Hall, the villages of Eccleston, Aldford, &c., and a number of isolated mansions and residences scattered over the estate. There are also several blocks of buildings contributing considerable quantities of sewage, such as the Eaton Laundry and the celebrated Eaton Stud. When I was called in to advise as to the disposal of the sewage on the estate, I found the highly objectionable and dangerous cesspit or overflow cesstank system in operation, a system which I am sorry to say is still almost universally in vogue at our country mansions and institutions, but the days of which, having regard to the progress of sanitary science, I venture to hope are numbered. I naturally endeavoured at the outset to collect the entire sewage into one common outfall sewer; but it was found that this was not practicable, owing to the contour of the ground and the distances between the various places, which would have entailed an outlay not at all commensurate with the volume of sewage to be dealt with. It was, therefore, decided to proceed with the work in sections. The first section, which has recently been completed, deals with the sewage from the Hall, as well as with the laundry washings; the second section, which will be commenced shortly, will deal with the sewage from the village of Eccleston and surrounding properties; whilst the remaining habitations, farm-sheds, &c., will deal with their sewage separately.

The Eaton Precipitation Station consists of accumulation tanks, mixing channel, precipitation tanks, and the building containing three rooms, one for the engine, another for the mixers for preparing the chemicals, and a third is used as a chemical store. By utilising sideling ground, I have been enabled to select a site which is an exceptionally favourable one, for not only does the sewage gravitate to the accumulation tanks, but it also gravitates from these to the mixing channel and precipitation tanks; moreover, the effluent as well as the sludge gravitate from the precipitation tanks, the former into a channel leading to the River Dee, the latter into air-drying pits close to the site.

The reason for accumulating the sewage in storage tanks, a system which I have adopted in similar installations where a sufficient fall is available, is this:—In small works the cost of labour in attending to the plant forms a very considerable item in the working expenses, and should therefore be kept down to the lowest possible limit. This can be done by accumulating if possible the entire day's sewage in storage tanks. The capacity of each division of the storage tank I adjust to correspond with the capacity of a similar division of the precipitation tank. In this way it is only necessary to discharge the sewage into the precipitation tanks in the morning, adding the chemicals during the discharge. Moreover, the chemicals I prefer to have made up in the mixers ready for discharge, the capacity of each being adjusted to correspond with the quantity of precipitant to be added to any one compartment of the storage tanks. In the present installation each compartment, and, consequently, each mixer, is adjusted by the man in charge to empty in about twenty minutes. Thus the proportioning of the chemicals—a very important matter in my opinion, and a problem presenting some difficulty in gravitation works where the equalising action of sewage pumps is absent and the flow of sewage is subject to sudden variations—becomes a very simple task.

A brief reference to the method of treatment adopted at the Eaton works will, I trust, be acceptable. It is the 'Amines' process, and its distinguishing characteristic is that it effects complete sterilisation. It is now generally admitted that any scheme of sewage treatment and disposal must aim at effective prevention of all nuisance and danger to health within reasonable limits of cost, and that whatever danger or nuisance is attributable to sewage is caused by the bacteria which it contains. Strides so rapid and discoveries so startling and of such direct bearing on the sewage question have been made in bacteriological science that any sewerage engineer who should ignore the lessons taught by those scientific discoveries would, I hold, commit a serious mistake. For, whether the plan adopted contemplates the treatment of the sewage in tanks or on lands, or both, with or without artificial filtration, the question of the bacteriological effects of the treatment obtrudes itself at every stage. At the tanks it is a question of avoiding putrefactive smell caused by the action of bacteria on the albuminoid organic matter. After artificial filtration, though the risk of putrefaction may have been minimised, the danger from disease germs is not excluded. Both land filtration and broad irrigation are open to objection on sanitary ground, unless all disease germs have been previously destroyed, for otherwise there is risk of contaminating the subsoil water, and as for broad irrigation that has clearly been shown to be capable of spreading disease through the medium of germs deposited on roots and leaves of farm crops.

Now as the 'Amines' process succeeds in destroying every species of germs contained in sewage, it follows as a matter of course that both the effluent and the sludge are non-putrescible, and further, that neither of them can be carriers of disease. I need not enlarge further upon this point, its importance being obvious. I have only to add that the cost of chemicals for the process is one halfpenny per thousand gallons of sewage treated."

On the motion of the President a vote of thanks was accorded to Mr. Wollheim for his paper.

Mr. Alfred M. Fowler, M.Inst.C.E., has been elected President of the Incorporated Association of Municipal and County Engineers. Mr. Fowler was formerly Borough Engineer of Leeds, Salford, and Newcastle-on-Tyne, and for many years has been in private practice in Manchester. He constructed the quay works on the river Tyne, the tramways in Salford at their introduction in this district; the large intercepting sewer for Salford, including the many large bridges in that town, and is now engaged on the outfall sewerage scheme for Stockport.

Illustrations.

PATHOLOGICAL INSTITUTE, GLASGOW WESTERN INFIRMARY.

THE illustration is taken from the drawing at present on view in the Royal Academy, for a new Pathological Institute, proposed to be erected at the Glasgow Western Infirmary, for the use of students attending classes there.

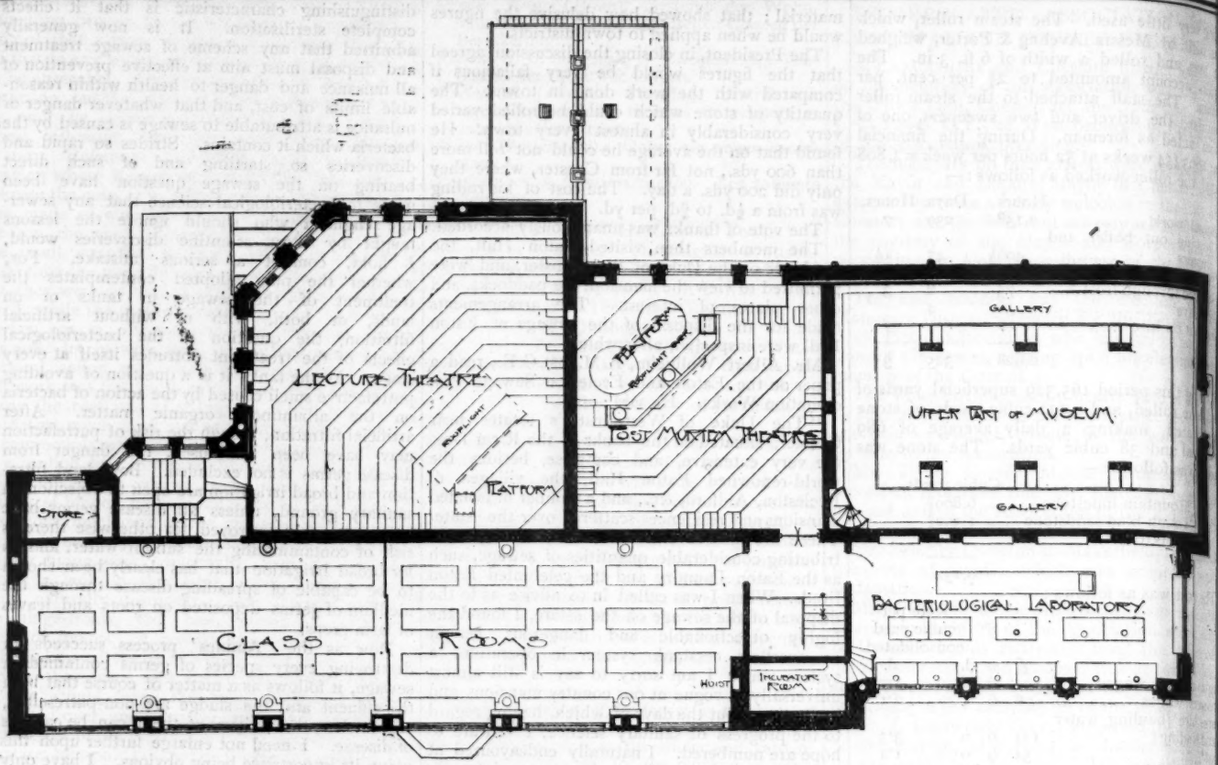
The external walls will all be built of local white stone, having an inside lining of 4½ in. brick, with 2½ in. space between, and all interior walls, with the exception of chapel, mortuary, staircase, and corridor walls, will be plastered on solid with Parien Cement.

The walls of the chapel and mortuary are to be faced inside with English pressed brick, with stone dressings at windows and doors, and the staircase and corridor walls are to be tiled. The floors of chapel and porch are to be laid with mosaic to design; those of the mortuary and post-mortem theatre platform with asphalte, turned up on walls, and the floors of corridor, staircase, and lavatories with tiles to design.

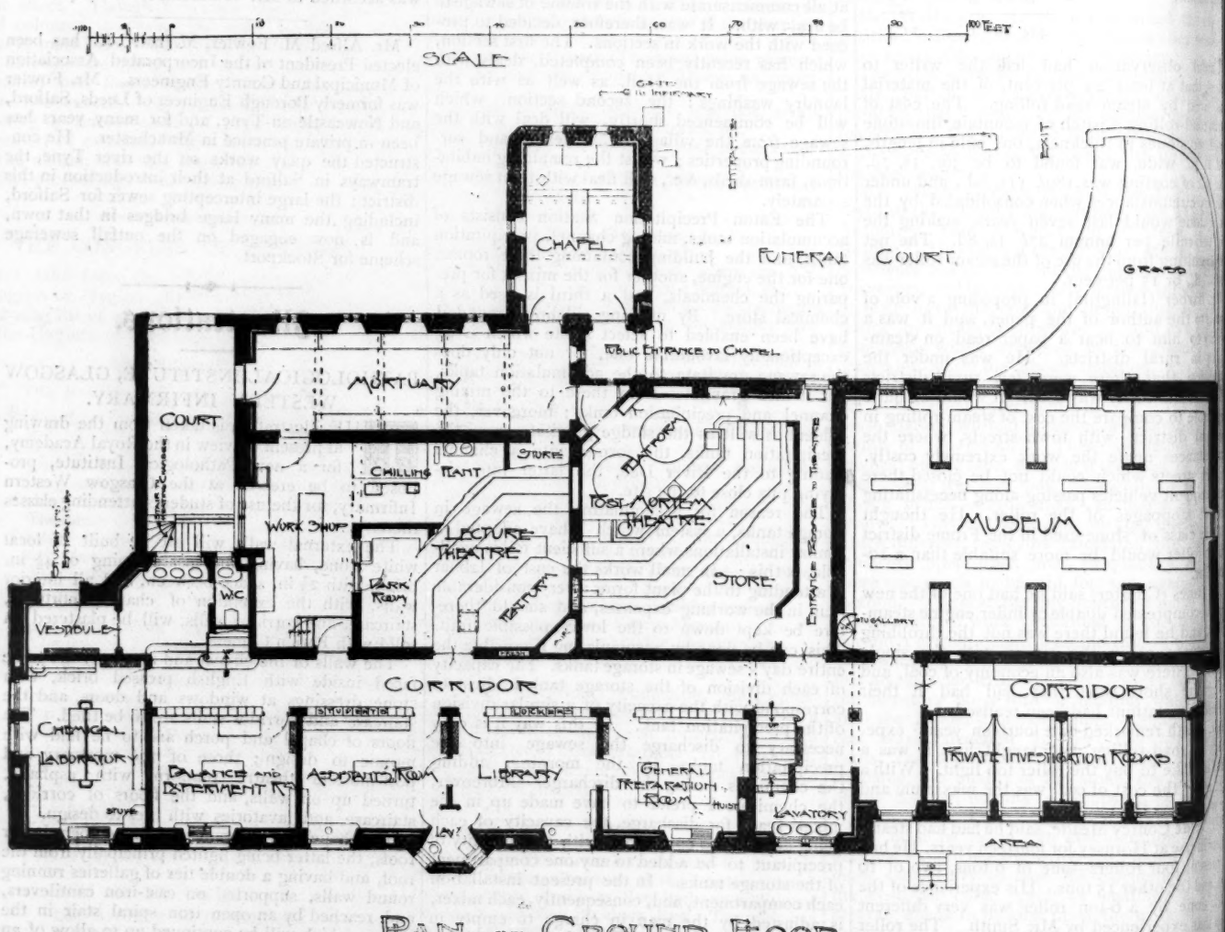
The chapel and museum are to have open timber roofs, the latter being lighted principally from the roof, and having a double tier of galleries running round walls, supported on cast-iron cantilevers, and reached by an open iron spiral stair in the corner, which will be continued up to allow of an exit to the flat concrete roof over the lecture theatre. The gallery is to be vaulted over with concrete and stone ribs.

Special attention has been directed to the heating and ventilation; the air will be admitted into air ducts under the ground floor and heated by hot pipes before entering the rooms.

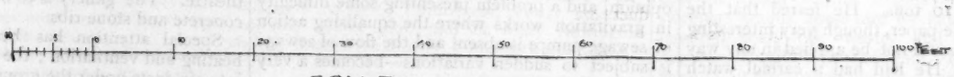
Exhaust shafts will be carried from each apartment into the large flèche in the roof, where a



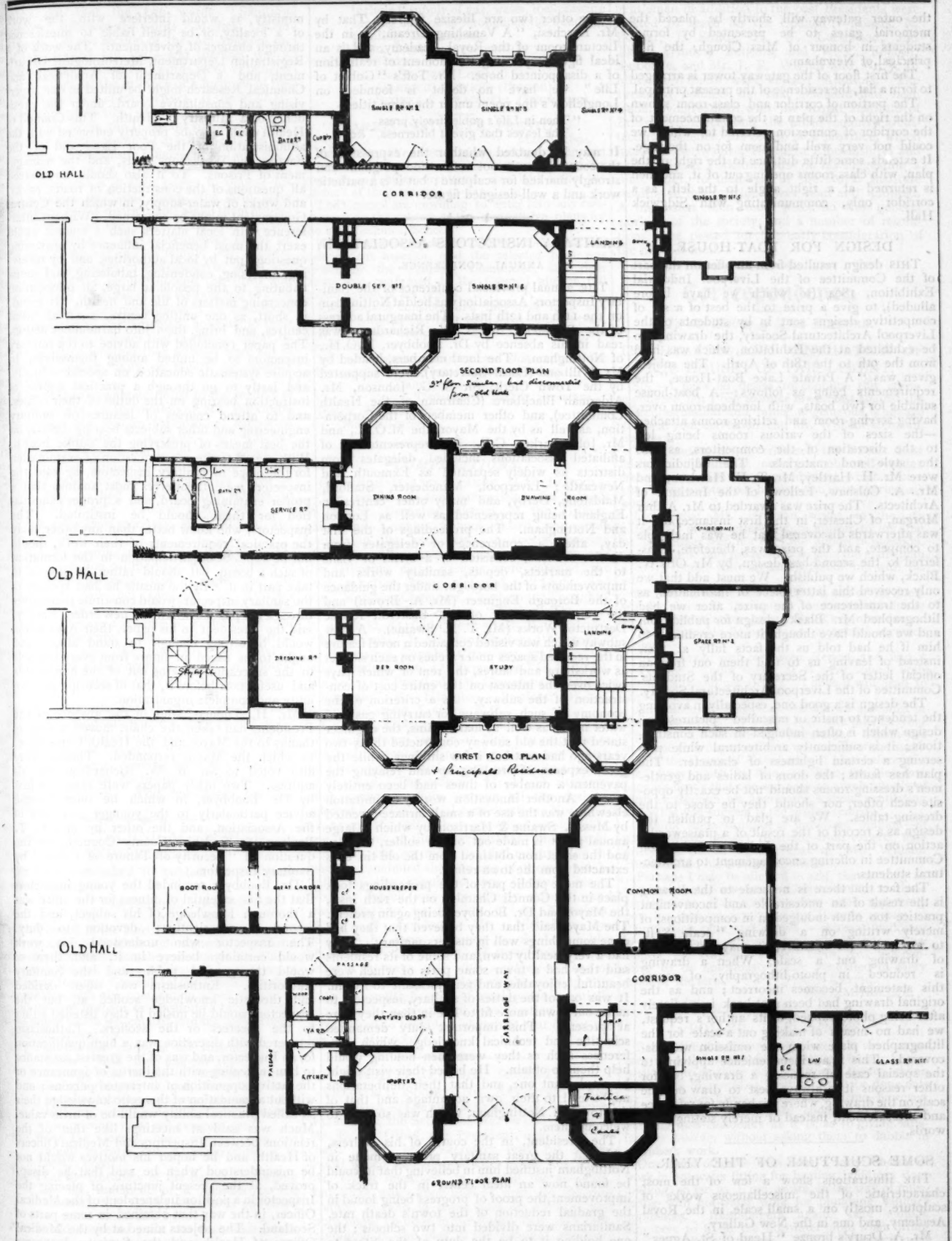
PLAN OF UPPER FLOOR.



PLAN OF GROUND FLOOR.



Proposed Pathological Buildings, Western Infirmary, Glasgow.



Plans, Pfeiffer Building, Newnham College, Cambridge.

row of hot coil pipes will be placed to increase the exhaust.

The building will be heated throughout by steam-pipes, carried along an underground duct from the new steam laundry buildings adjoining, and each coil will have a fresh-air supply. Provision is also being made for lighting the building by electricity.

The whole interior will be finished in such a way as to admit of being easily and thoroughly cleansed, all corners being slightly rounded, and every possible means adopted to prevent the harbouring of germs or the lodgment of dust.

The architects are Messrs. John Burnet, Son, & Campbell, of Glasgow.

THE PFEIFFER BUILDINGS, NEWNHAM COLLEGE.

THE "Pfeiffer buildings" form the latest extension of Newnham College, the cost of which has been mainly defrayed from a bequest from the lady whose name it bears. They are so arranged as to form a connexion between the old and Sidgwick halls, the latter of which is already united by a corridor with Clough Hall. Thus a complete passage way, under cover, is established between all the separate halls of which Newnham College consists.

As the new building has to extend over the main entrance to the quadrangle, it has been cast in the form of a gateway tower, and the entrance is commanded by a porter's lodge. In

the outer gateway will shortly be placed the memorial gates to be presented by former students in honour of Miss Clough, the first principal of Newnham.

The first floor of the gateway tower is arranged to form a flat, the residence of the present principal.

The portion of corridor and class-room shown on the right of the plan is the commencement of the corridor of connexion referred to, which we could not very well find room for on the page. It extends some little distance to the right of the plan, with class-rooms opening out of it, and then is returned at a right angle to the left, as a corridor only, communicating with Sidgwick Hall.

DESIGN FOR BOAT-HOUSE.

THIS design resulted from an offer on the part of the Committee of the Liverpool Industrial Exhibition, 1894 (to which we have before alluded), to give a prize to the best of a set of competitive designs sent in by students of the Liverpool Architectural Society, the drawings to be exhibited at the Exhibition, which was held from the 9th to the 18th of April. The subject given was "A Private Lake Boat-House," the requirements being as follows:—A boat-house suitable for two boats, with luncheon-room over, having serving-room and retiring-rooms attached —the sizes of the various rooms being left to the discretion of the competitors, as also the style and materials. The adjudicators were Mr. H. Hartley, Mr. T. H. Harrison, and Mr. A. Culshaw, Fellows of the Institute of Architects. The prize was awarded to Mr. Arthur Morgan, of Chester, in the first instance, but it was afterwards discovered that he was ineligible to compete, and the prize was, therefore, transferred to the second best design, by Mr. Otis W. Black, which we publish. We must add that we only received this latter piece of information, as to the transference of the prize, after we had lithographed Mr. Black's design for publication, and we should have thought it more creditable to him if he had told us the facts fully at first, instead of leaving us to find them out from an official letter of the Secretary of the Students' Committee of the Liverpool Architectural Society.

The design is a good one, especially in avoiding the tendency to rustic or miscalled "picturesque" design which is often indulged in such constructions; it is sufficiently architectural while preserving a certain lightness of character. The plan has faults; the doors of ladies' and gentlemen's dressing-rooms should not be exactly opposite each other, nor should they be close to the dressing-tables. We are glad to publish the design as a record of the result of a praiseworthy action on the part of the Industrial Exhibition Committee in offering encouragement to architectural students.

The fact that there is no scale to the drawing is the result of an undesirable and inconvenient practice too often indulged in in competitions, of merely writing on a drawing "scale 8 ft. to an inch" (or whatever it may be), instead of drawing out a scale. When a drawing is reduced in photo-lithography, of course this statement becomes incorrect; and as the original drawing had been sent back immediately after being photographed, at its author's request, we had no means of making out a scale for the lithographed plate when the omission was discovered. This is an inconvenience applying to the special case of reducing a drawing, but for other reasons it is always best to draw out the scale on the drawing, where it is handy for reference and measurement, instead of merely stating it in words.

SOME SCULPTURE OF THE YEAR.

THE illustrations show a few of the most characteristic of the miscellaneous works of sculpture, mostly on a small scale, in the Royal Academy, and one in the New Gallery.

Mr. A. Drury's bronze "Head of St. Agnes" is one of the most remarkable busts in the Academy this year, not only for its execution, but for the conception; the expression of the face being stern and heroic rather than that mild lamb-like expression which is commonly given to St. Agnes in painting and sculpture. Mr. Toft's "The Oracle" is to some extent another phase of the idea displayed in his head entitled "Mysteriarch" in last year's Academy; a head of solemn and abstract expression with an earnest forward gaze. Miss Halse's "Naughty" is a charming study of a child's head.

"The Rising of the Dawn" is a small miniature group by Mr. E. Roscoe Mullins, in the hall of the New Gallery.

The other two are lifesize figures. That by Mr. Lucchesi, "A Vanishing Dream," is in the Lecture-room of the Royal Academy, and is an ideal figure expressing the moment of realisation of a disappointed hope. Mr. Toft's "Goblet of Life" we have no doubt is founded on Longfellow's fine poem under the same title—

> "Then in Life's goblet freely press
> The leaves that give it bitterness," &c.

It may be doubted whether the expression of the countenance is not rather too poignant and strongly marked for sculpture; but it is a pathetic work and a well-designed figure.

SANITARY INSPECTORS' ASSOCIATION:

ANNUAL CONFERENCE.

THE annual provincial conference of the Sanitary Inspectors' Association was held at Nottingham on the 11th and 12th insts. The inaugural address of the President, Sir B. W. Richardson, was read in his absence by Dr. Boobbyer, M.O.H., of Nottingham. The local members, headed by Mr. Willbond (Local Secretary), were supported by the Town Clerk, Sir S. G. Johnson, Mr. Alderman Blackburn (Chairman of the Health Committee), and other members of the Corporation, as well as by the Mayor, the M.O.H., and Mr. John Parker, C.E. The representatives of affiliated associations included delegates from districts as widely separated as Exmouth and Newcastle; Liverpool, Manchester, Stafford, Maidstone, Derby, and many other centres in England being represented as well as London and Nottingham. The proceedings of the first day, after a conference of delegates from district councils, consisted of a series of visits to the markets, depôts, sanitary works and improvements of the borough, under the guidance of the Borough Engineer (Mr. A. Brown) and the general manager of the Eastcroft Refuse Destructor Works (Mr. T. R. Swaine). A new subway which was visited contained a novel feature in the recessed spaces under arches on each side let as workshops and stores, the rent of which pays twice over the interest on the entire cost of construction of the subway. As a criterion of the economy of such subways for carrying gas and water mains as well as main drains, the engineer stated that the old subway constructed thirty-two years ago had cost but a few shillings, while the great expense of breaking up and relaying the pavement a number of times had been entirely saved. Another innovation worthy of imitation elsewhere was the use of a small furnace invented by Messrs. Swaine & Harrison by which a large annual profit is made out of the solder, the tin, and the sheet-iron obtained from the old tin cans extracted from the town refuse.

The more public part of the proceedings took place in the Council Chamber on the 12th inst., the Mayor and Dr. Boobbyer being again present. The Mayor said that they believed that they had done some things well in matters sanitary. They had a very healthy town, and some of its residents said they had a town some parts of which were beautiful, enjoyable, and very pleasant to live in. It was one of the duties of sanitary inspectors to make our towns more fit to live in than they were at present. This important duty demanded scientific and technical knowledge, which conferences such as they were then holding would help them to obtain. He hoped their visit might be a pleasant one, and that their deliberations might tend to their own advantage and that of the town of Nottingham, which was so glad to welcome them.

The President, in the course of his address, said that the great sanitary progress made in Nottingham justified him in believing that it would be found now an ideal centre in the track of improvement, the proof of progress being found in the gradual reduction of the town's death rate. Sanitarians were divided into two schools; the one holding it to be the duty of the State to control and direct all matters that concerned the public health, and the other holding this to be an error. The Government, said the latter school, was overworked, and had already tasks in hand that no Government had either time or ability to perform. The idea of an omnipotent central authority was inconsistent with the spirit of the English people and would not advance sanitation. He was in favour of the view that every local authority should in its own district be master of its position, and do what was best for the sanitary needs of the district it ruled over, but he would not advise that the State should take no part in the work. In his opinion there ought to exist a Ministry of Health, but not such a ministry as would interfere with the work of a locality, or be itself liable to interference through changes of government. The work of a Registration Department, Meteorological Department, and a Department of Analytical and Chemical Research might be united in one supervising and consultative board, under the presidency of a Ministry of Health. This Council of Health could also be properly entrusted with the administration of the Poor Law, and of the Factory and Workshops' Acts, and the management of Prisons. To it also should be referred all questions of the construction of roads, parks, and works of water-supply, in which the Central Government might be concerned. Without interference with local matters such a council could exert the most beneficial influence by answering questions put by local authorities, and by receiving, analysing, condensing, tabulating, and redistributing to the people at large, all information concerning matters of life and health. It could, in short, as one uniting centre, assist all local centres, and bring them into harmonious action. The paper concluded with advice to the sanitary inspectors to be united among themselves, to acquire systematic education on special subjects, and lastly to go through a practical course of instruction bearing on the duties of their offices, and to attend courses of lectures on sanitary engineering and other subjects bearing directly on the best means of preserving the public health. With regard to the vexed question of examination for the office of sanitary inspectors, he said the inspectors were themselves most anxious that a proper examining board, and a proper examination for them, should be instituted. The inspectors, who knew better than any other body the practical requirements of their work, should not be kept out of participation in the formation of such a board, but should rather be invited to take part in it. By the means he had spoken of the sanitary inspectors would constitute themselves through the popular will into a new order. Finally, said the President in his paper, their Association would be strong enough to stand alone, and ought to be saved in future from every obstacle to the successful working out of the honourable and useful task before it, that of securing its own unity and complete organization.

Mr. H. Thomas, who, in the absence of the President, had taken the chair, moved a vote of thanks to the Mayor and the Health Committee, to which the Mayor responded. Thanks were also voted to Sir B. W. Richardson for his address. Two other papers were read, the first by Dr. Boobbyer, in which he offered some advice particularly to the younger members of the Association, and the other by Mr. F. T. Poulson (Staffordshire County Council), on the question of "Security of Tenure of Office" by Sanitary Inspectors.

Dr. Boobbyer reminded the young inspectors that the first essential of fitness for the office was a thorough knowledge of his subject, and the second a conscientious devotion to duty. The inspector who understood his work would certainly believe in it, and then so would the general public and the Sanitary Authorities. Enthusiasm was often derided and theoretic knowledge scoffed at, but the Inspectors would be misled if they listened either to the sneerers or the scoffers. Enthusiasm tempered with discretion was a high qualification for an Inspector, and was of the greatest assistance to him in dealing with the inertia of ignorance or the active opposition of interested persons; and without a foundation of theoretic knowledge their so-called practical ability would be of little value. Much was said at meetings like that of the relations between Inspectors and Medical Officers of Health, and he hoped his motives would not be misunderstood when he said that he disapproved, at the present juncture, of placing the Inspector in a position independent of the Medical Officer, in the way that obtained in some parts of Scotland. The objects aimed at by the Medical Officer of Health and the Sanitary Inspector ought to be, and were, the same, but if these officials were working at cross purposes, the public would be the losers, and their work and authority would suffer. Above all, let them not suppose that they had reached, or come within measurable distance of, finality in their knowledge or their methods. All who had eyes to see agreed that the science of Public Health was an infant—and an infant yet in long clothes.

Mr. Poulson in his paper pointed out that, by the Public Health (London) Act of 1891, Medical Officers of Health could not now be appointed for a limited period only and could not be removed by the sanitary authority except with the consent of the Local Government Board. He further

pointed out that the two words "Sanitary Inspector" followed the words "Medical Officer of Health," in the section of the Act referred to, as it was drafted, but that—and the fact was a lamentable one—these two words were expunged at a later stage, at the instance of a member of the British House of Representatives. If the M.O.H. needed the protection of the Act, for fixity of tenure in his office, the Inspector required it also. Under the system of annual appointments, he was subjected to antagonistic influences and was often compelled, in order to avoid giving offence to persons who had it in their power to oppose his reappointment, to "tone down" the lurid glare of nuisances in his district, and make them appear less injurious than they really were. If he "put matters too strong," the consequences might be disastrous to himself and his family. Mr. Poulson urged the Association to endeavour to enlist the sympathies of the public through the Press and the individual members of the Association to send information of meetings addressed by candidates for municipal and Parliamentary honours, to their local secretaries, in order that questions might be put to ascertain whether they were or were not in favour of giving fixity of tenure to sanitary inspectors.

Votes of thanks were accorded to the readers of both the papers, on the motion of Mr. Wilkinson (Derby) and Mr. Jacklin (Maidstone) supported by Mr. Fairchild, (Clapham), Mr. Lindley (Batley), Mr. Washington Lyon (hon. member), Mr. Councillor Robinson (Nottingham), and the Chairman, who declared Mr. Poulson's paper to be the best he had heard on the subject of "Tenure of Office." Votes of thanks were also accorded to the local secretary, Mr. Willbond, and to the President.

Before the meeting closed Mr. Tidman, C.E., moved a resolution calling upon the conference to put on record an expression of regret that the Government had not included the Sanitary Inspectors' Association in the list of bodies invited to prepare a scheme of examinations for Sanitary Inspectors. The motion was carried unanimously, and the members were invited to partake of a luncheon, provided in another part of the building by the courtesy of the Health Committee.

In the afternoon the visitors proceeded in a body to the Guildhall, where a large photographic group was taken, the provincial and metropolitan representatives of Councils, under the presidency of Mr. H. Thomas, meeting again at a later hour in the Council-room, for the discussion of proposed alterations of rules. This terminated the proceedings.

HARRIS TECHNICAL SCHOOL COMPETITION.

WE have been asked to publish the following correspondence :—

22, Guildhall-street, Preston,
May 2, 1894.

To the Council of the Harris Institute, Preston.

GENTLEMEN,—We, the undersigned unsuccessful competing architects for the erection of the Harris Technical School, desire to draw the attention of the Harris Institute Council to the following points in connexion with the competition which appear to us, on the face of them, to constitute a breach of the terms under which we entered into the competition.

It would appear :—

(1.) That the first clause of the Instructions lays down "that the amount for shell of building from bottom of footings upwards, including supply of gas, water, and low-pressure heating apparatus throughout the building, painting, finishing, and architects' commission, must not exceed 8,500*l*."

(2.) That the Council have selected, and are about to carry out, a design which is to cost 13,000*l*.

(3.) That the costliness of the design—according to the statement of a member of the Council, Mr. Healey—has been cut down to come within this 13,000*l*.

We would desire to point out that, under these circumstances, those competitors whose designs were in accordance with the limit of cost laid down are thus placed in an unfair position by the acceptance of a design which, by the first clause of the Instructions, ought to have been disqualified.

Having regard, therefore, to our rights as competitors, and with a view to ascertaining our position, we would respectfully request that the Council should satisfy us on the following points :—

(1.) Whether the selected design is proposed to be carried out.

(2.) Whether the contract plans are in conformity with the design as selected, or otherwise.

(3.) Whether the contract plans include any greater extent of building than the 8,500*l*. was stipulated to provide for, including architect's commission, and whether they include "supply of gas, water, low-pressure heating apparatus throughout the building, painting, and finishing."

We are, Gentlemen, respectfully yours,
JOSEPH V. HIBBERT (Preston).
G. SEDGER (London).
GARLICK & SYKES (Preston).
STONES & GRADWELL (Blackburn).

HARRIS INSTITUTE, PRESTON,
May 9, 1894.

DEAR SIR,—Your letter of the 2nd inst. addressed to the Council of the Harris Institute, signed by yourself and other architects, was laid before the Council at their meeting to-day.

The Council are unwilling to enter into any controversy on the subject of the competitive plans for the new Technical School.

The plans were reported upon by a competent and independent assessor, and the selected plan was chosen by the Building Committee, and their choice was confirmed by the Council after a full consideration of his report,

The Council consider that they have fairly and properly selected the best and most suitable plan, and that no competitor has any reason for complaint.

Will you please communicate this reply to the other gentlemen who have signed the letter.

I am, yours truly,
THOMAS R. JOLLY, Secretary.

Jos. V. Hibbert, Esq.,
Guildhall-street.

COMPETITIONS.

GILLINGHAM AND GRANGE U.D. SCHOOLS.—The result of the competition for schools in the St. Barnabas' district of the Gillingham and Grange School Board was made known on the 10th inst. A special meeting of the Board was held to consider the plans, and the following eight designs were selected, the final selection being deferred :—"Light and Air," Matthew Chambers, Chatham; "Thought," J. W. Nash, Rochester; "Father Thames," P. A. Todd, 33, Old Queen-street, Westminster; "Educational," J. M. Pinn, Exeter; "Neptune," E. Habershon, Lonsdale Chambers, 27, Chancery-lane, London, W.C.; "Experience," G. E. Bond, Rochester; "Practical," M. Chambers, Chatham; "Fortuna," F. Hingston, Portland House, Basinghall-street, London, E.C.

CHURCH, COCKINGTON, TORQUAY.—Twenty-one designs were sent in on May 1 in response to an advertisement inviting designs for a new church for Cockington, which is now practically a suburb of Torquay. The assessor, Mr. H. H. Statham, after going carefully through all the designs, selected five for special consideration, Nos. 2, 4, 11, 15 and 16. All of these presented considerable, one or two of them exceptional, merit architecturally, but on more detailed examination the assessor concluded that no one of them could be built for the stipulated sum (5,000*l*.) except No. 4, which was accordingly selected, and was found to be by Mr. C. A. Nicholson, M.A., of London. Mr. Nicholson has adopted the form, common in old Devonshire churches of the district, of three nearly equal aisles in the nave, each with a ridge roof, and no clearstory; a form of design which, avoiding lofty walls and multiplication of windows, is essentially economical; a paramount consideration where it was desired to provide a church to seat 600 at the low cost of 5,000*l*.

ARCHITECTURAL SOCIETIES.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—The annual meeting of this society was held at the School of Art on the 10th inst., Mr. E. M. Gibbs, the President, occupying the chair. The hon. secretary read his annual report which was adopted after some discussion. Mr. Gibbs remarked, in moving the adoption, that there was a good field of work for the new Council to take in hand, and he thought that more might be done in the future than had been attempted in the past if the younger members especially put their hands to the work and cordially supported the new Council. The Treasurer's report was also read and adopted, and it was decided that both reports should be printed and circulated. The deaths of the late E. McDougall and B. H. Wightman, Fellows, were announced, and votes of condolence with their families were agreed to. A ballot then took place, Messrs. C. Gibson and E. Winder, jun., acting as scrutineers, for the election of officers and Council for the ensuing year, with the following result :—Mr. E. M. Gibbs was re-elected President; Mr. E. Hadfield was elected Vice-President; Mr. F. Fowler, Treasurer; and Mr. C. J. Innocent, Hon. Secretary, and the following gentlemen in addition to the past Presidents were elected to serve on the Council :—Messrs. R. Fowler, J. Smith, H. W. Lockwood, and Thos. Winder, Fellows, and W. C. Fenton, Associate, and Mr. J. R. Wigfull and Mr. J. B. Mitchell-Withers were elected Auditors. The President pointed out that Sheffield had been made, by agreement with the Royal Institute of British Architects and the allied country architectural societies, the centre of a province, which included Derbyshire, Northern Lincolnshire. and part of South Yorkshire, and on his suggestion a draft letter, to members of the Royal Institute residing in the province, was read and adopted. A discussion then took place on the general working of the society, and a number of resolutions were passed for the early consideration of the new Council.

Correspondence.

To the Editor of THE BUILDER.

THE HEATING AND VENTILATION OF THE HOUSES OF PARLIAMENT.

SIR,—I have no desire to continue this correspondence, but I beg to enter my protest against the misrepresentation and rather ungenerous language in which your correspondent, Mr. William Henman, indulges.

Your leading article criticised the Report most fairly and favourably, only you objected—under error—to one of my recommendations, which error—after being pointed out by me—you most courteously admitted.

From what Mr. Henman writes, in the 4th paragraph of his letter, it does appear to me that he has neither seen nor read the Report in question, and I shall be only too pleased to send the gentleman a copy, should you very kindly favour me with his address.

Sir Isaac Holden, Bart., M.P., is one of the most wonderful men of the century, and understands the science of ventilation, practically, if any man does.

This venerable baronet and successful inventor writes :—

"I have read with care your Report, and find it everything I could wish. It is very sound, both scientifically and practically. I hope it will lead to improvement."

An eminent architect and well-known specialist in ventilation writes :—"I have read with interest your report on the Houses of Parliament. I think you have put your finger on the true cause of the stuffiness of the House of Commons. I have before now tried (very much in vain) to drive the idea into people's heads that one can pass an ample supply of fresh air through an apartment without ventilating it. What you suggest is the proper remedy."

I think these samples of unbiassed opinion—of many I have already received—from experts, may safely be placed against that of Mr. William Henman and his elementary facts.

Perhaps I may be allowed to add, that so long as architects hold views on ventilation similar to those expressed by your correspondent—who apparently pins his faith so firmly to the Plenum system or "propulsion pure and simple"—colossal buildings like the Houses of Parliament, the London Law Courts, the National Liberal Club, &c., will continue to be notoriously badly ventilated in every sense of the term.

JAMES KEITH,
Assoc.M.Inst.C.E.

BOILER EXPLOSIONS.

SIR,—"Æolus" writes as if all that were necessary to make the hot-water fittings in our houses perfect as to working and safety were to stop giving such work to plumbers, and to let it be done only by "hot-water fitters." It seems to me, however, that hot-water fitters have enough to do with pleasing their customers as it is, as to giving satisfactory *heating*, without asking them to dabble in plumbers' work.

One friend of mine who does a large amount of work in hot-water fitting for heating buildings does nothing, so far as I am aware, in the way of interfering with hot-water work for plumbing sanitary appliances. Ironmongers, again, here employ plumbers to fit in the hot-water pipes when fitting in their kitchen ranges. The "plumber" who cannot fit in the hot-water pipes to and for his sanitary appliances as well as the cold ones is only half a plumber—his education in his trade is only half-finished. "Æolus" has told us nothing new in the way of precautions. These have been pointed out often before, but in the case, *e.g.*, of dead-weight safety-valves it is difficult, and especially in new work, to get the architects or measurers to specify them in the schedules, and the plumbers can hardly be expected to be so philanthropic as to either put them on for nothing, or to do so in defiance of the architect or customer. I have lately used dead-weight safety-valves myself on the top of the hot-water tank a few feet from the boiler, while I have had a safety-valve on the upper pipe between the tank and the boiler in my own

house for the last ten years, so if "Æolus" be a "hot-water fitter" himself, there is nothing in his letter to show that he can teach us anything as plumbers, so far as the hot-water work of plumbing sanitary appliances is concerned. There are good and bad plumbers, just as there are good and bad hot-water fitters. If the work be given to an incompetent man, be he "plumber" or "fitter," the result is likely to be unsatisfactory. Cheap estimating also tempts to bad work, such as I came across a few days ago and condemned—possibly it was done by a "hot-water fitter"?—viz., connecting the hot-water crane at the kitchen sink to the circulating pipe between the boiler and tank (so as to save a few feet of pipe), instead of connecting to above the tank. The bad effect of this was to empty the tank if cold supply was temporarily off.

W. P. BUCHAN.

OWNERSHIP OF ARCHITECTS' DRAWINGS.

SIR,—I shall be much obliged if some correspondent will refer me to a decision since 1880 respecting the above, in the case where buildings have been erected and the architects' charges have been paid. NEMO.

P.S.—Is the matter affected by the Copyright Act adverse to or in favour of the architect?

FREE LIBRARY AND TECHNICAL SCHOOL, ALTRINCHAM.—Free library and technical school buildings were opened at Altrincham on the 5th inst. The new buildings have been erected from the designs of Mr. Popplewell, architect, Manchester.

The Student's Column.

THE STRUCTURE AND PHYSICAL PROPERTIES OF BUILDING STONES.—XX.

7. THE COTTESWOLD DISTRICT.

A VERY large number of quarries, for the most part used for purely local purposes, are situated in the oolitic rocks stretching northward from Bath to the neighbourhood of Cheltenham and beyond. The accompanying geological sketch map (fig. 32) indicates the sites of about eighty of the principal workings, but although we are well acquainted with many of them, we are precluded, for want of space, from describing other than the more important centres. The best areas are in the vicinity of Leckhampton, Tainton, Painswick, Minchinhampton, and Nailsworth. The building stones occur on two horizons, separated by a bed of oolitic marl, and are known as the lower and upper freestones, respectively.

The quarries at Leckhampton, situated near the summit of the Inferior Oolite escarpment overlooking Cheltenham, are regarded as classic ground for the study of that formation. The stone is let down the steep incline to the plain beneath by means of a winding apparatus, but a comparatively small quantity of the material is used for building purposes. The lower freestone is here about 110 ft. in thickness. It is, in general, rather hard, arising from the circumstance that the oolitic granules and fragments of crinoids, &c., are not only themselves very crystalline, but the abundant matrix holding them together is equally so. The harder stones break with a hackly fracture. The internal decoration of Magdalen College Chapel, Oxford, is of Leckhampton stone.

Tainton, some miles to the south-east of Leckhampton, has been celebrated for many years for its freestones, though quarries at Tainton itself—on the downs—are either closed or but spasmodically worked. They provided the material for some of the oldest buildings in Oxford, viz., those of the twelfth, thirteenth, and fourteenth centuries, which are still in a good state of preservation. The church at Burford, and many other edifices in the vicinity, are also witnesses of the excellence of the material. It was used in the interior of St. Paul's Cathedral, and in many other London churches.

The Great Oolite has been extensively quarried at Windrush, in the same district, where the stone is followed under the hill by tunnelling. The material is a fine white oolite, coming out in large blocks, the only zone in for quarrying being about 7 ft. in thickness. It may be described as a cream-coloured stone, with fine oolitic granules in a crystalline matrix, fragments of shells, &c., not being very abundant. Four miles to the east, at Burford, are several freestone quarries supplying the wants of the neighbourhood.

The building stones of Painswick are, perhaps, better known than any others on the Cotteswolds, and deservedly so. They are situated on the high ground to the north of the village. The student may be cautioned as to the source of origin of several so-called "Painswick stones," which do not come from the point now under consideration, but are found near Stroud, and on the road to Tetbury. Indeed, the term seems to be applied to all the cream-coloured building-stones raised some miles to the south and east of Painswick. In the vicinity of the last-mentioned place are four principal workings, known as Plantation, Painswick Hill, Scotchguar Hill (or Hedge Hill), and Frith quarries respectively.

Section at Plantation Quarry.

Rubble and rough stone 24 ft. in thickness.

Building stone, closely bedded and irregularly jointed..... 24 ft. in thickness.

The joints being so close together the average blocks yielded are rather small; but one taken out at the time of our visit measured as much as 7 ft. by 4 ft. by 2 ft. 6 in., and was about to be despatched to Gloucester Cathedral. The stone is never blasted except at such places as the joints may run tight. It is of a light cream colour, and may be described as very fine-grained, composed of minute and regular oolitic granules embedded in a crystalline matrix: shell matter is rare. It differs from the Bath stones, with which it has considerable analogy, by the more crystalline nature of the granules, and by its exceedingly fine and uniform grain.

Passing out of the wood we ascend nearly to

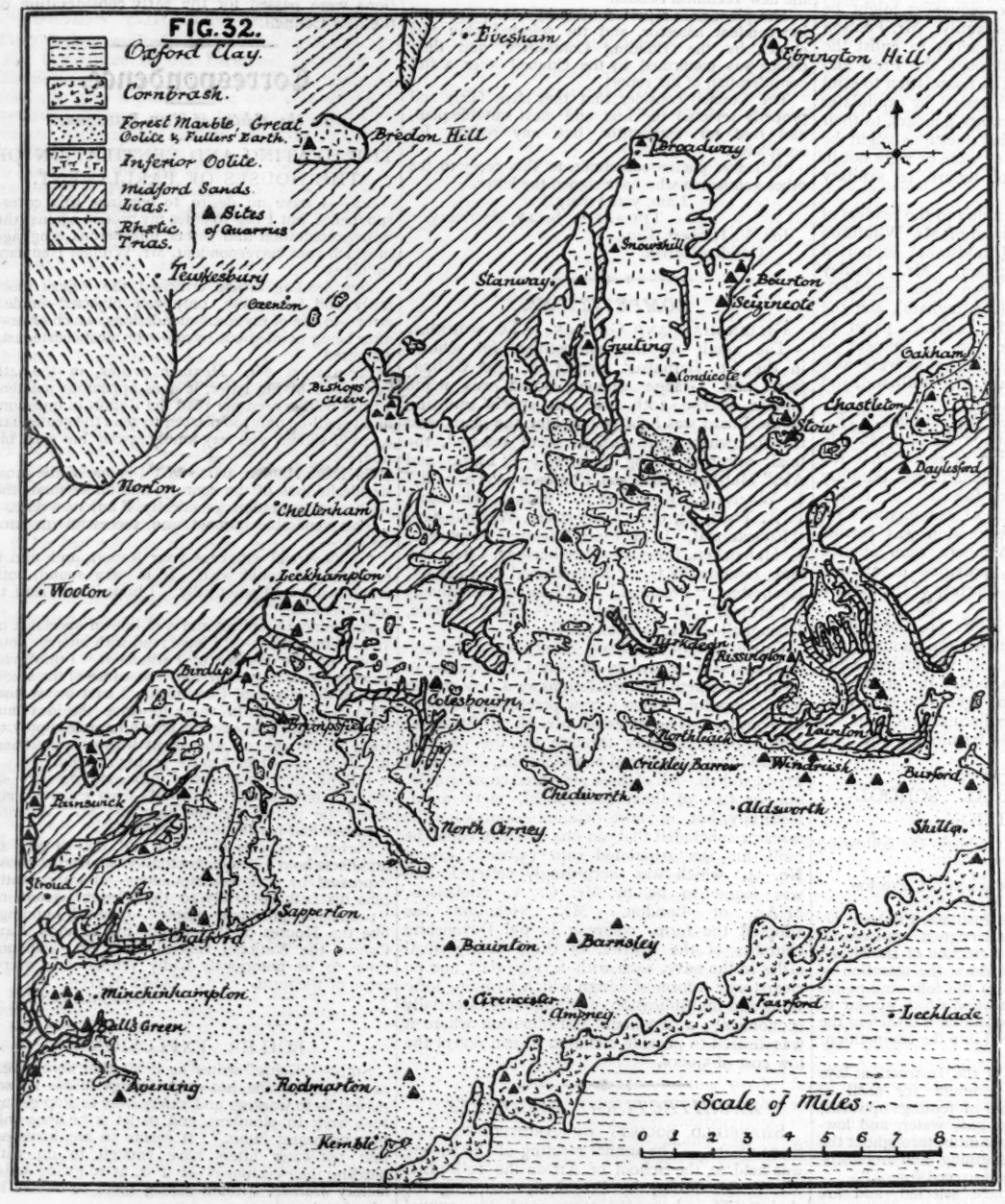


FIG. 32.—*Geological Sketch Map of the Cotteswold District.*

the summit of the hill, and walking over some downs see the

Section at Painswick Hill Quarry.

Overburden, rubble, and rough stone, mostly burnt into lime .....10 ft. in thickness.
Building stone, irregularly bedded, joints frequent .....40 ft. in thickness.

The best beds are situated about 12 ft. to 20 ft. from the base, where we saw some blocks 5 ft. on the bed. Other blocks measured 4 ft. by 9 ft. by 4 ft. and 8 ft. by 3 ft. 6 in. by 4 ft. The appearance of the stone in the quarry is very satisfactory; we noticed that when dry it is hard enough to take a slight polish, and were consequently not surprised to observe that its rate of weathering was extremely slow. Its micro-structure is essentially the same as that from the last quarry described. In selecting these Painswick stones, care should be taken to see that they are free from small iron-stained holes. In the bottom beds of the quarry now being described these holes are somewhat frequent, and they are not altogether absent from any of the beds.

At the summit of the hill is a large ancient entrenchment, several old quarries, and one or two new ones; judging from the enormous waste heaps, the stone industry hereabouts must at one time have been in a very thriving condition. All the quarrymen now employed in the district are on day work; and the piece-work system is not adopted, even for masons and sawyers.

Returning to Stroud, we ascend the steep Rodborough Hill,* and taking the Tetbury road, a walk of three miles brings us on Minchinhampton Common, where there are several quarries in the Great Oolite. The blocks obtained are of any practicable size, and they are of a light greyish tint. The structure of this stone is somewhat remarkable, as will be seen on reference to our illustration (fig. 33). It is made of extremely

FIG. 33.

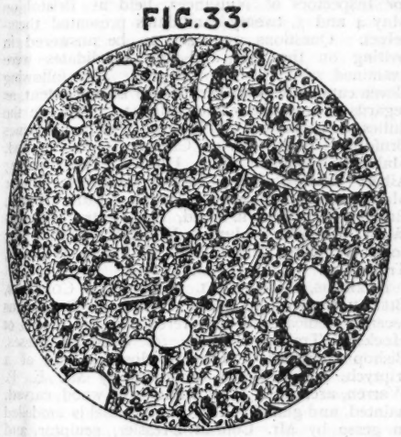


FIG. 33.—*Micro-structure of Minchinhampton Stone.*

small and crystalline oolitic granules, with equally minute skeletonised shell fragments, and an occasional larger piece, the whole being bound together by a highly crystalline matrix, partly calcareous and partly siliceous. Here and there are free quartz sand grains, whilst ovoid holes denote the former existence of large and apparently well-formed oolitic granules. We particularly noted that for the most part the holes were there when the stone was *in situ*, and they do not therefore owe their origin to the preparing processes. The student will see at a glance that the structure of Minchinhampton Common freestone is totally different to that of any other material hitherto described. When carefully selected it should be durable; some beds are hard enough to take a slight polish. It is sometimes known as "Hampton stone."

NEW FACTORIES BILL AND GLASGOW BUILDING REGULATIONS.—The measure introduced by the Home Secretary to amend and extend the law relating to factories and workshops contains some interesting provisions. Under the Glasgow Buildings Regulations Act it is provided that where there is situated above the first floor a workroom, in which more than ten persons are employed, it must have a passage or stair, having access to a street or court, and built of incombustible material. In this respect the Act seems to have anticipated the Bill now before Parliament, as it, for the first time in a public general statute, contains clauses providing a similar safeguard.—*Glasgow Evening News.*

* For illustration of this see the *Builder* for October 28, 1893.

GENERAL BUILDING NEWS.

NEW CHURCH AT PEMBROKE DOCK.—On the 2nd inst. the memorial stone of St. Patrick's Church, Pennar, was laid by Lady Catherine Allen. The site for the building was given by the War Department, and the structure will be of hammered limestone indigenous to the locality, with Bath-stone dressings. The principal dimensions are:—Length, 84 ft.; breadth, 47 ft.; with a bell turret at the west-end. The architects are Messrs. Nicholls & Son, Hereford, and the builders are Messrs. Davies & Morgan, Pembroke, whose contract is for 1,687*l.*

BUILDING OPERATIONS IN EDINBURGH.—No fewer than thirty-four applications for warrant came before the Edinburgh Dean of Guild Court on the 2nd inst. A number of them had reference to alterations merely; one or two, however, embodied rather extensive building schemes. The fifteen warrants granted included one to the North British Railway Company to execute alterations at Haymarket Station, to bring it into accordance with the scheme for the doubling of the railway line between Corstorphine and Abbeyhill.

MEMORIAL HALL, SEAHAM HARBOUR, NEWCASTLE.—On the 5th inst. the foundation and memorial stones of a hall which it is the intention of the *employés* of the Seaham Harbour bottleworks to erect to the memory of their late employer, Mr. Robert Candlish, were laid. The building is to be erected from designs by Mr. Frank Caws, architect, Sunderland. It will have a frontage of 40 ft. in one direction, and of about 56 ft. in the other. The Memorial Hall proper will occupy rather more than one-half of the site. It is about 48 ft. long, 22 ft. 6 in. wide, and about 21 ft. high, and will be used as a concert-hall and meeting-room. The other part of the site will be occupied in front by a game-room and a news-room. Over these will be the committee-room. The main entrance will have a wide double doorway, surmounted by a semi-circular terra-cotta arch, resting on carved side columns. The arch covers a porch, at the back of which are the main doors admitting to the hall, and over these are fanlights executed in stained glass. Above the porch is a small music-gallery communicating with the news-room. All the windows of the hall and main front will have cathedral-tinted leaded glass, and there will be a dado of pitch pine round the hall about 4 ft. high. Inside the hall will be placed a bust of the late Mr. Candlish, modelled in high relief by George Tinworth. The contractor for the whole of the work is Mr. George Gradon, of Durham; the plastering has been sub-let to Mr. Rule, of Sunderland; the plumbing to Mr. J. G. Kirtley, Sunderland; and the painting and glazing to Mr. G. N. Arnison, Sunderland.

METHODIST CHAPEL, BELFAST.—On the 4th inst. the new chapel at Osborne Park, Belfast, was dedicated. The ground on which the edifice is erected is situated near the Lisburn-road end of Osborne Park, on which it has a frontage of 100 ft. The internal dimensions of the church are 68 ft. long and 35 ft. wide, in which provision has been made for seating 420 adults. The elevations of the buildings are in Late Gothic style, built of red bricks, with dressings of red sandstone, The front elevation contains the entrance doorway, over which is a four-light window, with cusped work in the heads of the lights. The buttresses in the front are terminated by pinnacles of wrought stone. The body of the church has two aisles, with pews in the centre, and also at the sides. The pulpit is constructed in pitch pine, with moulded arcading. Accommodation for the choir has been provided on a raised platform adjacent to the pulpit, behind which is situated the chamber for the organ. The roof timbers, which are exposed to view, have been built of pitch pine, the ceiling being formed by sheeting, the underside of rafters with wood of light colour. The windows are glazed in cathedral leaded lights. The church is heated by Musgrave's small-bore apparatus, and the gasfitting executed by Mr. Willis. The church has been erected by Mr. Kidd, from the plans and under the superintendence of Mr. J. J. Phillips, C.E., both of Belfast.

THE RESTORATION OF PETERBOROUGH CATHEDRAL.—A dedicatory service was held at the Cathedral Church of St. Peter's, at Peterborough, on the 10th inst., to celebrate the completion of the restoration of the edifice. The new works consist of—1. An organ by Hills & Son, costing 4,400*l.*; 2. The reredos and baldachino of alabaster, at a cost of 1,300*l.*, from a design in the church of Santa Maria Cosmita, in Rome. The architect was Mr. J. L. Pearson, R.A.; 3. Choir gates of hand workmanship by Singer, of Frome; 4. The sanctuary screens of hand-wrought grill work by Gibbons and White, 450*l.* These fill the four east bays of the choir; 5. The completion of the mosaic pavement, by Messrs. Davison, the builders of the baldachino; 6. The re-table of alabaster; 7. Eight stalls, the work of Messrs. Thompson, of Peterborough; 8. Altar-rails, sub-stalls, lay-clerks', and choristers' seats; 9. Credence table of Hoptonstone, the whole costing 9,000*l.*, in addition to 30,000*l.* already expended.

TOWER, BLACKPOOL.—The Blackpool Tower was opened to visitors on Monday. The buildings were commenced during the winter of 1891–92. Although the structure itself has been practically finished, other details of the original scheme, such as restaurants, assembly-room for dancing, &c., are still in course of construction. The formal opening will not take place until late in the season. From the base to the top of the steel flagstaff, the tower is a little over 500 ft. high. The main platform is at a height of 410 ft., being completely under cover and cased in with plate-glass fixtures. Two lifts, worked by hydraulic power, make the ascent and descent in a little under one minute for each journey. Messrs. Maxwell & Tuke, of Manchester, were the designers of the tower. Messrs. Heenan & Froude, of Manchester, supplied the steel and iron work, letting the subcontract of erection to Mr. James Bell, of Liverpool.

CATHOLIC SCHOOLS AT BLYTH.—The Rev. John Cuthbert Hedley, O.S.B., D.D., recently laid the corner-stone of new schools to be built in connexion with Our Lady and Sir Wilfrid's Catholic Church, Waterloo-road, Blyth. The structure is to be built of ordinary red brick with stone facings, and will comprise two large class-rooms and a mixed school. Mr. Charles Walker, of Newcastle, is the architect, and Mr. Cecil E. McCann, of Malvern, the builder.

CHURCH, SKELMANTHORPE, YORKSHIRE.—On the 12th inst. the Bishop of Wakefield laid the foundation-stone of S. Aidan's Church, at Skelmanthorpe. About eight months ago a movement was set on foot to build a church, and a building committee was appointed. Messrs. Bodley & Garner, of London, prepared plans for the church estimated to cost 4,000*l.* if the whole were carried out, or 3,000*l.* if the south aisle were not built. The tender of Messrs. George Hinchcliffe & Son, contractors, Clayton West, for the lesser scheme was 2,407*l.*, and this was accepted.

RESTORATION OF BACTON CHURCH, WALES.—On the 8th inst. the ancient Welsh Church at Bacton, near Pontrilas, was reopened after undergoing restoration, at a cost of 1,100*l.* The work has been carried out by local workmen, under the direction of Messrs. Nicholson & Son, architects, Hereford.

FREE LIBRARY, GORTON.—A free public library for the Gorton district, established by the Manchester Corporation, was opened on the 5th inst. by Dr. A. W. Ward, Principal of Owen's College. The library is built on a triangular plot of ground situated at the junction of Gorton-lane and Belle Vue-street. The portion at the junction of the two streets is an octagon measuring 29 ft. 6 in. in diameter, and communicating by wide arched openings with two wings, each 21 ft. wide, facing the two streets, the portion between them forming an open area for light. The ground floor is 6 ft. above the street level, in order to give good light to the basement floor, in which is a boys' reading-room, book store, and heating apparatus. The entrance to the building is in Belle Vue-street. A staircase leads up to the first floor and down to the basement, the staircase hall having an octagonal end with large windows lighted from the area. To the left of the entrance on the ground floor is the library, which, with the rooms for the attendants, occupies the whole of the floor. The library is fitted with bookcases, &c., all constructed of pitch-pine, stained and varnished. It is lighted with windows on all sides. The first floor is entirely occupied by the reading-room. The warming of the building is carried out with hot-water in pipes and radiators, and this and the ventilating arrangements have been done by Mr. E. Hatton, of Manchester. The elevations are faced with grey bricks, with red terra-cotta in windows, door, cornice, and string-courses. A feature has been made of the octagonal corner, which is covered by a hipped roof crowned by a square clock turret. The total height from the street level to the top of the iron vane is about 81 ft. The clock, which has four illuminated dials, has been supplied by Messrs. J. & T. Foster. The cost of the building and fittings has been about 4,100*l.* The whole of the work has been carried out by Mr. Thorpe, contractor, of Cornbrook, from the designs and under the superintendence of Messrs. J. W. & R. F. Beaumont, architects, Manchester.

WEST RIDING COUNTY COUNCIL OFFICES.—The tender of Messrs. Armitage & Hodgson, contractors, of Leeds, has been accepted for these offices, to be erected at Wakefield; the amount of the tender is 76,824*l.*

SANITARY AND ENGINEERING NEWS.

WEST WORTHING WATERWORKS.—On the 5th inst. the new reservoir erected by the West Worthing Waterworks and Baths Company, at a cost of over 5,000*l.*, on the high ground at Coate, was opened. The site is about three miles from Worthing, 125 ft. above the sea level. The work was designed and carried out under the supervision of Messrs. Quick & Son, water engineers. The reservoir is formed of concrete, and covered with a concrete roof, and is capable of holding 150,000 gals., while it is so designed that it can be enlarged at any future time. The contractor was Mr. W. W. Smith, of Worthing. The opening of this reservoir, says the *Daily Telegraph*, enables the West Worthing Waterworks Company to deliver a constant service of water throughout the whole district covered by their Parliamentary powers, while by a trifling addition they can be made to afford an abundant supply for the whole of Worthing in case an emergency should arise.

WATER SUPPLY OF NEWCASTLE.—In the course of an official report, Mr. W. G. Laws, the City Engineer of Newcastle, says:—The total storage on March 7 only amounted to 1,928,000,000 gallons. No water to speak of has been obtained since, and the chances of getting any large quantity before next winter are not good. It is clear that the only chance for making the limited supply last out is by economising it in every possible way both for public purposes and in private houses. Should the same rate of consumption go on as prevailed last year, the present stock would only last four months, and then we should have got the last drop—that is, in the middle of September we should have to resort to water pumped from the Tyne, and to get that, must largely curtail or stop the trade supply. Fortunately, the daily consumption so far is not above ten millions, as compared with fifteen last year, and if this limitation can be kept up through the summer, we can look forward to six months before we come to Tyne water; that is, to the middle of November. The new works of the Water Company, in the valley of the Rede, cannot possibly afford any relief before the middle of 1895, if even then. By that time their new mains may be laid so far as to enable them to take a limited and intermittent supply from the Rede, which could not exceed six millions per day, and that only at intervals. It will be seven years before their new Catcleugh Reservoir is completed, and then, and not before, a constant supply of seven to eight millions a day may be relied on. But for the present year we are in the position of having to face the possibility of drinking Tyne water pumped at Wylam. Analysis shows but little difference in the quality of water taken from the river at Wylam and that obtained direct from the gathering-grounds at Colt Crag. Chemical analysis, however, is but a very rough way of arriving at the relative purity of water. I venture to think that Dr. Koch's researches will revolutionise present ideas on filtration and its practice, and will go far to remove prejudices against rivers as a source of water-supply. These facts are not mentioned with any view of suggesting that we should not go to the purest possible source for our water—that no one could possibly advise—but to show that in case of real necessity, the prospect of drinking river water need not be very alarming. If the needs of the large towns go on increasing at the rate at which they have done within late years, we are within measurable distance of the time when all the available head water of the water-sheds will be taken up, and future extensions will, of necessity, have to be lower on the streams and rivers; and the population on the rivers is, slowly perhaps, but perceptibly, becoming denser, so that even the head waters are gradually deteriorating. In view of this, it is comforting to know that modern scientific research points to the possibility—nay, probability—that river water may, by careful treatment, be made to yield a perfectly pure and wholesome drink for the people.

SEWAGE WORKS, RAWDON.—The Local Government Board have now approved a loan of 4,446*l.* for land, and 11,000*l.* for works of sewerage for the district of Rawdon in Yorkshire. The sewage will be purified by chemical precipitation in tanks, followed by land filtration on 15 acres of land. The scheme has been delayed for some time through the arbitration for the purchase of the land. The engineer to the scheme is Mr. W. H. Radford, C.E., of Nottingham.

LAVATORIES, &C., AT THE ANTWERP EXHIBITION.—Finch's Siphonic Water Closet was selected by the committee for use in the public lavatories at Antwerp Exhibition, on account of their large water area in basin, and the rapidity of discharge. Messrs. Finch & Co. have also supplied and fixed the urinals and lavatories throughout the building, the work being done by English workmen.

FOREIGN AND COLONIAL.

FRANCE.—As many people expected, the competition for a design for the new postage stamp has resulted in a fiasco, the jury having rejected all the designs. After this decision, the Postal Department has renounced any intention of interfering with the present postage stamps.——The Académie des Beaux-Arts has been officially informed that an international competition is to be held—to be decided by an international jury—to raise a monument at Perouse to Perugino.——MM. Coutan, Cugnot, Injalbert, Peynot, Lanson, and Saint-Marceaux are candidates for the chair at the Académie formerly filled by the late sculptor Cavelier.——An exhibition of the "Société des Miniaturistes et Enlumineurs de France" will be held in the Georges Petit Gallery from June 12 to 27.——The opening of the exhibition of works by Carpeaux will take place on the 20th at the École des Beaux-Arts. The catalogue includes about 500 works, among which are many models of the celebrated group of "Le Danse." There will be a certain number of drawings also recording the fêtes given by the Imperial Court in 1867, on the occasion of the visits of crowned heads to the universal exhibition of that year.——The tubular railway from Sceaux is finished as far as the Place de la Sorbonne, under which is the "yard" for shunting. Ballast trains circulate already from one end to the other, under the Boulevard St. Michel, and the result of the experiment so far is said to be satisfactory.——The Minister of Public Instruction opened last Sunday, at Poitiers, the new buildings erected for the Faculties of Literature, Science, and Art.——M. Dutert, architect of the Museum of Natural History, is at present engaged in erecting a new block of buildings in brick and iron, which will be adorned with sculptures by the most eminent animal sculptors of the day: MM. Frémiet, Barrias, Marqueste, J. Coutan, Gardet, Louis Noel, Engrand, Truffot, Houssin, and Lormier.——The Abbey of Mont St. Michel has hitherto retained its old tower which dates from the tenth century; but in view of the present dilapidated and dangerous state of this ancient building, there is talk of replacing it by a "modern Gothic" work.——The Art Exhibition at Tunis was opened on Saturday last.——On June 10 and following days the Archæological Society of Sens will celebrate its fiftieth anniversary. Among the archæological attractions of the programme are the public meetings which will be held in the ancient Synodal Hall, restored by Viollet-le-duc, and the hearing in the cathedral of an ancient piece of music revived according to a manuscript of the twelfth century.——The painter, Charles Jacques, has just died at Paris, at the age of eighty-one. He was born at Paris (1813) and commenced his studies as an engraver, but soon turned to *genre* painting. His talent was chiefly for rustic scenes and family interiors, and he became a recognised painter of country house interiors and domestic animals. As a painter he obtained medals at the Salons of 1861 and 1863, and a gold medal at the 1889 exhibition. Among his best-known works may be mentioned "Une Basse Cour," "La Sortie du Troupeau"; "Grand Troupeau au Pâturage"; "L'abreuvoir," &c. Jacques, during his long and laborious career, was an ardent advocate of the art of etching and of original engraving by artists. He leaves two sons, both painters of talent.——The monumental bridge over the Marne between Bonneuil and Saint Maur-les-fossés has just been completed. It will be opened on May 27.

GERMANY.—The executive committee of the 1896 Exhibition, in which the delegates of the Chamber of Commerce are now enrolled, has, after receiving the report of the "Site Commission" decided in favour of Lietzensee. The decision is endorsed by over two-thirds of the intending exhibitors from whom answers have been received, and will most probably be confirmed by the grand committee with whom rests the final settlement of the question. Charlottenburg has decided to double its original contribution of 7,500*l.*, the whole dependent, of course, on the Lietzensee site being chosen.——The General Electric Company of Berlin intend to start, this summer, the building of a large central supply station on the Spree, just above Berlin, principally with a view to supply the Eastern industrial quarters.——A new Asylum for Homeless Men is to be erected in the Wiesenstrasse at a cost of 20,000*l.* The Municipality will probably grant the land free of cost.——The proposed Electric Railway under the Spree, between Stralau and Trepton, will probably be continued as an electric tramway at either end, terminating at the Oberbaum Bridge on the Stralau, and at the Görlitz Railway Station on the Trepton side.——A Thuringian Industrial Exhibition was recently opened at Erfurt.——A petition in favour of a canal from the Rhine to Niers, at a cost of 750,000*l.*, is to be handed in to the Government.——The canalised Fulda is to be opened for traffic by April 1, 1895.——The City of Munich intends to purchase the house which contains the Schack collection from the heirs of the deceased count, so as to obviate a removal of the art treasures.——The Bonn "Yearbook of the Society of Antiquaries" contains a description of the Roman mosaic flooring recently discovered at Creuznach, and now completely laid bare. The mosaics, which measure in all 6 4-5ths by 7 2-5ths mètres, represent, for the most part, gladiatorial combats.——The recently-discovered wall paintings in the St. Peter's Church at Augsburg, which date from the year 1300, have been restored by Herr Lochner, the painter of the ceiling of the St. Max Church in that town.——Excavations recently undertaken on the Herapel, near Forbach, in Lorraine, where the foundations of a Roman Camp and of a Temple to Apollo were discovered in 1884, have resulted in the tracing of the Northern Tower and of a number of dwelling-houses. Numerous coins and architectural relics have been brought to light.

ITALY.—The Milan "United Exhibitions" were opened by the King on May 6. The exhibition consists of ten sections, and is completely a private venture of the citizens of Milan.

MISCELLANEOUS.

STATUES, ST. MARY MAGDALENE, OXFORD.—A series of statues have been placed in the new reredos at St. Mary Magdalene, Oxford. The reredos itself was designed and carried out under the immediate direction of Mr. Harry W. Moore, F.R.I.B.A., of Oxford. Acting under his suggestion the commission for the work of making occupants for the eight vacant niches was entrusted to Messrs. Harry Hems & Sons, of Exeter. The new statues are as follows:—going from the north, (1) the Virgin Mary, veiled and bearing a lily; (2) St. Catherine crowned, with a sword in one hand and a martyr's palm in the other, at her side a fractured wheel; (3) St. Frideswide, in abbess attire, bearing a crozier and crowned: (4) St. Mary Magdalene, holding the alabaster pot of ointment in her right hand; (5) St. George in armour, transfixing the dragon with a spear; (6) St. Hugh of Lincoln, dressed as a Carthusian monk, but coped, mitred, and holding a crozier; (7) St. Thomas of Canterbury, in full canonicals, bearing an archiepiscopal staff and with the mitre he wears cleft by a sword; and (8) St. Simon Stock, in the habit of a Carthusian monk.

WATER SUPPLY OF CHERBOURG.—According to a recent report of the British Consul at Cherbourg, the Municipal Council of that town, finding that there is no other available source capable of furnishing water in sufficient quantity than the river Divette, from which the existing supply is derived, are about to purify the water of that stream by filtration. The river is tapped about half-a-mile from the town and the water pumped to a reservoir, from whence it is distributed by gravitation to the houses. This system worked well for a very long period, but of late years the erection of houses, mills, and other works, together with the increased use of manures, chiefly artificial, above the point where the supply is obtained, deteriorated the water to such an extent as to cause the recurrence of typhoid fever and other epidemics. Upon analysis the water was proved to contain organic matter and unwholesome germs in appreciable quantities. With the view of finding an efficient remedy, a committee of the Municipal Council proceeded to London for the purpose of investigating the systems of the great water companies. In consequence thereof it is probable that the system employed by the Chelsea Waterworks Company will be adopted at Cherbourg, but this requires consideration and time. Meanwhile, a temporary expedient has been carried out, by erecting a number of filters of the Maignen patent, each calculated to furnish 1,100½ gallons of purified water per day in various parts of the town.

THE SANITARY INSTITUTE.—At an examination for Inspectors of Nuisances, held at Bristol on May 4 and 5, twenty candidates presented themselves. Questions were set to be answered in writing on the 4th, and the candidates were examined *vivâ voce* on the 5th. The following eleven candidates were certified to be competent, as regards their sanitary knowledge, to discharge the duties of Inspectors of Nuisances:—Francis James Bruford, Manchester; Charles Cecil Broad, Malvern; William John Hughes, Ton Pentre; Albert Edward King, Bristol; George Hunter Macdonald, Bedford; Joseph Munro-Chick, Bridgewater: Gwilym Reed, Ton Pentre; Thomas Wells, Leicester; James Williams, Treherbert; John Williams, Abertillery: William Williams, Treherbert.

REREDOS, HOCKERILL TRAINING COLLEGE, BISHOP STORTFORD.—The Bishop of St. Albans recently dedicated a new reredos in the chapel of Hockerill Training College for Schoolmistresses, Bishop Stortford. The reredos consists of a triptych, designed and decorated by Mr. E. P. Warren, architect. The frame is of wood, carved, painted, and gilded. The central panel is modelled in gesso by Mr. Conrad Dressler, sculptor, and represents the Crucifixion. The re-table is also wooden and painted. The whole of the woodwork is by Mr. L. A. Turner, of London. When the triptych is completed the centre portion will be surmounted by three carved figures of angels, and the panels in the doors, which are temporarily painted, will be replaced by panels bearing representations of saints or angels.

ROYAL METEOROLOGICAL SOCIETY.—At the monthly meeting of this Society on the 16th instant, at the Institution of Civil Engineers, Westminster, Mr. W. Marriott, F.R.Met.Soc., gave an account of a series of observations on the "Audibility of 'Big Ben' at West Norwood," which he had carried on for a period of five years. The Clock Tower at Westminster is 5¼ miles distant from the point of observation in a north-by-west direction. The observations were 976 in number, and were made at the hours of 9 a.m. and 9 p.m. The bell could be heard more frequently in the evening than in the morning, and on Sundays it was more frequently audible than on week days. The direction of the wind most favourable for hearing it was between west and north. The observations were also discussed in relation to temperature, moisture, cloud, and barometric pressure.

INDIAN MONUMENTS AND THEIR PRESERVATION.—In our last issue we gave portions of the annual report of the Royal Institute of British Architects, including the Council's memorial to the India Office on the subject of the preservation of Indian monuments. The extracts which we printed were taken from the draft report, which did not include the reply of the India Office to that memorial, which was as follows:—"Sir,—I am directed by the Secretary of State for India in Council to acknowledge the receipt of your letter of the 19th ult., enclosing a memorial from the Council of the Royal Institute of British Architects regarding the classification and preservation of the Historical Monuments of India. In reply, I am to state for the information of your Council that the subject of

their memorial has for nearly fifty years engaged the earnest attention of the Government of India. The archæological survey of Upper India, by the late General Sir Alexander Cunningham, K.C.I.E., was sanctioned by them in 1861-62; and in 1870 they organised a department for the archæological survey of the whole of British India, under the direction of General Cunningham, who remained at its head until his retirement in 1885, when it was reorganised on a plan submitted by General Cunningham himself to the Government of India. Again, in 1880 they sanctioned a special classificatory survey, to better provide for the protection, first of the monuments of Lahore, Delhi, and Agra, and afterwards of the whole of British India, appointing Captain (now Colonel) Henry Cole, R.E., to this duty, under the title of Curator of the Ancient Monuments of India; and when his survey was completed in 1888, the work of the conservation of these buildings was handed over to their natural guardians, the local authorities of the Provinces and Districts in which they are to be found. These arrangements are every year proving more and more satisfactory. The sum spent on the archæological survey of India now amounts to about Rx.6,000 a year; and an equal sum is spent on conservation, exclusive of the expenditure on the annual repair of historical buildings used for Government offices and other public purposes. In these circumstances the Secretary of State cannot undertake to suggest to the Government of India any modification of the existing arrangements. I am, however, to add that Mr. Fowler warmly appreciates the interest taken by your Council in the historical monuments of India, as evinced by their present memorial, a copy of which he will forward to the Government of India. — I am, Sir, your obedient servant, A. GODLEY."

CAPITAL AND LABOUR.

SETTLEMENT OF THE NORTH STAFFORDSHIRE BUILDING TRADE DISPUTE.—A meeting of representatives of the North Staffordshire Master Builders' Association and of the Builders' Labourers' Society, was held at Hanley on the 3rd inst, when the dispute in the local building trade was practically settled. It appears that the labourers sent in a notice for a rise of wages from 4¾d. to 5¼d. per hour, the notice to take effect on the 1st. inst. The masters replied, pointing out that the custom of the trade was that notice of any alteration of rules or prices should be given on January 1 in each year, and as the notice in question had not been thus given it could not be entertained. The men thereupon asked the masters to meet them in conference for the purpose of discussing the question. This request was acceded to and the meeting held as stated. After between two and three hours' discussion, the masters' representatives agreed to recommend to their association that they offer to the labourers a farthing per hour increase during November, December, January, and February, the question as to whether this increase be continued during the months of March and April of next year being left over for decision at a meeting to be held in February. Mr. J. Ward, President of the Bricklayers' and General Labourers' Union, intimating that if the farthing per hour increase was conceded the men would be satisfied and the dispute would be at an end.

CARPENTERS' AND JOINERS' DISPUTE, ST. HELENS.—Mr. W. Powell, President of the St. Helens Master Builders' Association, on the 12th inst. received the award of his Honour Judge Collier, who sat as arbitrator in the dispute between the carpenters' and joiners' societies of St. Helens and the Master Builders' Association. The alterations of the rules are as follow:—The arbitrator gives the men ½d. per hour advance. They asked for 1d. Their wages will now be 8½d. per hour. The men wanted the hours of work limited to fifty per week, or four less than they are at present working, and this is allowed. The weekly wage will now be 35s. 5d., as against 36s., or 7d. less, but four hours' work less. During the four months of winter the hours in the shop were forty-nine per week at the summer rate of wage of 8d. per hour, which was the old rate, making it 1*l.* 12s. 8d. per week. He has altered that to 46½ hours. The men must leave off work at five o'clock at night instead of half-past five o'clock in the winter. Where artificial light was not provided originally, the hours were 46½ per week, at ½d. per hour more on outside jobs, now it is all uniform, both for work inside shops and on outside jobs—viz., 46½ hours at the summer rate of wage, which will be 8½d. per hour. He will not allow any alteration in the apprentice rule. The men wanted the limit to be one apprentice to four men, but that is not allowed. His honour will allow nothing to be mentioned about machine-made joinery, this decision being in the following words: "I don't give effect to the rule about machine-made joinery." For alteration of rules, the six months' written notice is right, but it must expire on the first day of May in any year. In this decision Judge Collier upsets the decision of Councillor Edward Johnson, Mayor of St. Helens in 1891, who was arbitrator in a dispute pending at that time. He allowed six months' notice to be given at any period.

MEETINGS.

FRIDAY, MAY 18.

Royal Institution. — Professor A. M. Worthington, M.A., F.R.S., on "The Splash of a Drop and Allied Phenomena." 9 p.m.

SATURDAY, MAY 19.

Architectural Association Camera Club. — Visit to Holy Trinity Church, Chelsea.

Edinburgh Architectural Association.—Visit to Dalzell House.

Glasgow Architectural Association.—Visit to Rothesay.

Queen's College, Cork.—Mr. Arthur Hill on "The History of Architecture." XVIII. 3 p.m.

MONDAY, MAY 21.

Surveyors' Institution.—Mr. T. W. Huskinson on "A Theory concerning the Primary Cause of the Depression in Trade and Agriculture." 8 p.m.

Clerks of Works' Association (Carpenters' Hall).—Paper by Mr. F. J. Barnes. 8 p.m.

TUESDAY, MAY 22.

Institution of Civil Engineers.—(1) Mr. Andrew Brown on "Recent Types of Ferry-Steamers." (2) Mr. Charles Jones, of Liverpool, on "The Birkenhead Ferry-Boats, 'Wirral' and 'Mersey.'" 8 p.m.

WEDNESDAY, MAY 23.

Carpenters' Company (Lectures on Carpentry and Joinery).—Professor T. Roger Smith on "Framing and Construction of Partitions, Floors, and Temporary Structures." 8 p.m.

THURSDAY, MAY 24.

Architectural Association (Great Marlboro'-street).—Mr. T. Stirling Lee on "Sculpture and its Relation to Architecture." 7 p.m.

Royal Institution.—Mr. W. M. Flinders Petrie on "Egyptian Decorative Art." I. 3 p.m.

Society of Antiquaries.—8.30 p.m.

Institution of Electrical Engineers.—Continuation of Discussion on the paper by Mr. R. E. Crompton, M.Inst.C.E., on "Cost of Electrical Energy." 8 p.m.

FRIDAY, MAY 25.

Architectural Association.—(1) Mr. Arthur Bolton on "The Practical Side of Travelling." (2) Election of Officers. 7.30 p.m.

SATURDAY, MAY 26.

Queen's College, Cork.—Mr. Arthur Hill on "The History of Architecture." XIX. 3 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

10,034.—IMPROVEMENTS IN CLOSETS: *E. O. Poppe.*—The improvement which is the subject of this invention, consists in providing a valve between the pan or seat and the soil-pipe. This valve takes the place of the usual junction pipe between the soil or drain-pipe and the pan of the closet, and allows the former to be kept closely shut off when the closet is not in use, so that no smell can escape therefrom into the room.

10,044.—FIREPROOF FLOORS, CEILINGS, &C.: *T. L. Banks.* — This invention relates to improvements in strengthening by iron rods or tie wires ceilings or floors constructed with "expanded metal," *i.e.*, sheet metal slit in such a way that when expanded the slits open out forming meshes or lattice-work.

10,271.—REMOVABLE SCAFFOLDING: *M. Kruse* (Copenhagen).—This is a platform riding on a single pole or rail and moved up and down by ratchet work controlled by those on the platform.

10,329.—WATER-CLOSETS: *W. Oates and J. J. Green.*—The trap is removed from underneath the pedestal and placed in a suitable position beyond the pedestal, where it can be got at for cleaning. Underneath the pedestal, in lieu of the trap, a pipe dished at the bottom is employed to receive and hold a given quantity of water, so that when soil is deposited the upsetting of the tipper will flush the dish or basin and so clear the matter contained therein.

10,949.—CHIMNEY-POTS, VENTILATORS, &C.: *W. H. Holt.*—The chimney-pot, which forms the subject of this patent, is provided with a centre passage, the outside being provided with angular or circular passages, with their upper ends disposed on a level or above the top or outlet end of this centre passage, by which a screw or circular current of air will be produced to assist smoke or air to be readily drawn through the same, from whatever direction the wind is blowing.

15,114.—PAPER-HANGING MACHINES: *A. H. Lolker.*—This is an elaborate piece of mechanism whereby the operations of trimming, pasting, and fixing the wall-paper is performed by machinery instead of by hand.

21,894.—GULLY-TRAP: *W. E. Pownall and another.*—This is a gully-trap, with a cleaning eye, in separate compartments, so constructed that the portion required to be cleaned by the general public (the receiver) is easily accessible; but the trap and drain portion is only accessible to men employed by sanitary departments.

2,839.—SASHES: *T. B. Brown.*—These are improvements in the mechanism for raising, lowering, balancing, retaining in position the sashes of sliding windows, and locking and securing the same, and a method of reversing the sashes for cleaning, glazing, &c. Mechanical means to all these ends are described in the specification.

3,803.—ARTIFICIAL STONE: *T. D. Harries.*—One part by measure of Portland cement is mixed with three parts crushed stone, and formed into a wet mass by the addition of water; it is then placed in moulds until sufficiently dry to be taken out without breaking—from three to six days—and then allowed to thoroughly dry, and rubbed down to bring into prominence its component parts. The surface is then brushed over with Portland cement in a fluid condition to fill in any inequalities or air-holes in the concrete. The artificial stone is varnished over with extra copal varnish, heated, and again polished.

4,068.—SASH WINDOWS: *A. Cope.*—A spring-actuated holder engages with the window-sash by means of a rack fixed thereon, but not so firmly but that the window can be raised and lowered.

4,084.—BLOWERS OR VENTILATORS: *J. Frans.*—A ventilator, blower, or fan for small localities and occupations, driven by spring-power, is so arranged that the number of revolutions of the fan may be varied as desired by means of a brake device.

8,469.—CHIMNEY COWLS, OR EXTRACTORS: *J. Kirkman.*—An obliquely-fixed disc, and a T-shaped piece of metal and frame are fitted to the pivot on which the cowl revolves. The effect of this addition is to increase the upward current or draught.

8,837.—WATER-CLOSETS: *J. Easby.*—A modification of the usual fittings for tanks. The weight opens the valve instead of closing it. When the closet seat is pressed down it closes the valve and opens a tap which fills the tank with water; when the pressure is removed the weight opens the valve and shuts off the water.

10,111.—GASALIERS: *J. N. Martin.*—The lamp shades are attached to chains passing through hollow bracket arms attached to the pulley frame. The chains are also attached to the weights or frame carrying the chandelier.

10,332.—WOOD-BLOCK FLOORING: *W. Shepherd.*—A self-locking system of keying or bonding together wood-block flooring, each block having a tenon worked on the two ends, and on the two sides a grooved joint for the purpose of receiving the tenon. The floor is by this means laid firmly and evenly with a good bond.

12,227. — FIREPROOF STRUCTURES: *T. L. Banks, F.R.I.B.A.*—Amongst other improvements, constructing trimmer arches for fireproof floors of a sheet of metal lathing, having its two sides bent up to an angle corresponding to that of the skewback and feather-edged piece of the trimmer joist, which metal lathing is then filled in with concrete.

12,228.—SHEATHING OR COVERINGS FOR COLUMNS: *T. L. Banks.*—This is an extension of the foregoing to the protection of columns, &c., and provides distance pieces to keep the lathing from the surface and also means for securing the lathing.

12,494.—FLUSHING CISTERNS: *H. R. Chubb.*—This is a cistern certain in its flushing action and automatic in the shut off or stoppage of the flow of water. The mechanical devices which ensure this are described at length in the specification.

15,436 and 15,437.—AUGER BITS: *A. L. Adams.*—Specially-devised cutters, the first to facilitate grinding and fixing, the second to form rosettes and seats for same.

16,344.—DOOR STOP: *E. Dredge.*—A spring bolt fitted on the lower part of the door to stop it where required. When not in use the bolt is drawn up and fastened by a catch.

23,059.—SET SQUARES: *H. A. Matear.*—To set off any angle, acute or obtuse, a movable limb is attached to a set square with slots in the perpendicular and horizontal limbs: by adjusting the movable limb by set screws to a marked scale any desired angle may be set off.

2,103.—HOUSE DRAINS: *E. Turner.*—An improved trap, wherein all the parts are easy of access for cleansing purposes, and so constructed that, even while the process of cleansing is taking place, the gases from the sewer are trapped or held back, and so prevented from injuring the person who may be so engaged.

3,221.—DRAIN-PIPES: *J. Jones and Another.*—A curved drain-channel is specially constructed with a view to prevent the accumulation of sewage on the floor or benchings of the inspection-chamber at either side of the channel.

3,269.—WINDOW FRAMES AND SASHES: *W. Sainsbury and Another.*—The sashes, although hung with weights and lines as usual, are readily reversed or taken out for cleaning, &c.

4,494.—WINDOW FRAMES: *G. S. Henderson.*—A method and appliances for locking or retaining the sash-frames of windows in their vertical-closed positions and making them wind and water-tight at the side edges, while they can be easily unlocked and swivelled or reversed within the apartment for cleaning, ventilating, &c.

NEW APPLICATIONS FOR LETTERS PATENT.

APRIL 23.—7,960, N. Tailby, Saw Benches.—7,964, W. Purdy, Cranes.—7,982, W. Robb and others, Fireplaces.—8,003, W. Heywood and W. Curbstone, Glazing and Roofing Buildings.—8,032, S. Holman, Heating and Ventilating.

APRIL 24.—8,040, A. Clifford, Ventilators, Smoke Preventors for Chimney Pots, Soil-pipes, Ventilating Shafts for Drains, &c.—8,058, W. and J. Leatherbarrow, Windows.—8,088, E. Howl, Kilns.—8,090, J. and W. McLoughland, Swivelling Windows.—8,108, G. Paine, Opening and Closing Greenhouse and other Sashes,—8,110, A. and F. Johnson, Water-closet.—8,139, F. Hoar, Fire Escapes.—8,147, G. Walker, Treating Fibrous Material for Ornamental or Decorative Purposes.

APRIL 25.—8,156, C. Hitchcock, Chimney Cowls.—8,168, W. Baker, Ventilator.—8,177, S. Ashworth, Paint and Varnish Cans.—8,194, G. Szekely, Combined Saw and Planer.—8,199, E. Löwy, Facing and Paving Tiles, &c.—8,204, H. Barham, Chimney Pot and Draught Inducer.—8,213, W. Storne, Zinc-white Paints.

APRIL 26.—8,257, W. Ross, Syphons for Water-closets, &c.—8,260, A. Brown and R. Barr, Fireplaces.—8,283, F. Knight, Securing Roofing Slates.—8,297, A. Caine and H. Gillmor, Paint Compound and Pigment.—8,298, A. Caine and H. Gillmor, Paint Compond and Pigment.—8,301, R. Robson, Paint Strainers.—8,319, J. Stidder, Water-closets.—8,333, C. Bethell, Reversing Window Sashes.

APRIL 27.—8,335, C. and W. Batcock, Straightening and Setting Teeth of Saws.—8,345, E. and W. Heath, Mitre Cramp.—8,351, G. Kirk and J. Harlow, Automatic Window-sash Fastener.—8,365, A. Downs, Invertible Window.—8,379, M. Gentry, Kilns.—8,393, T. Goldie and G. Hayman, Ventilators.

APRIL 28.—8,417, R. McDonald, Water-waste Preventers for Flushing.—8,428, J. Holt, Syphon Flushing Cisterns for Water-closets, &c.—8,444, J. Brathwaite, Manhole and Ventilator for Sewage-pipes.—8,453, W. Connell, Regulating Fanlights and Skylights.—8,498, C. Jones, Water-closets.

APRIL 30.—8,501, A. Clifford, Flushing Cistern or Waste Water Preventer.—8,505, J. Tait, Pipe Coupling.—8,508, J. Mulligan, Chimney or Ventilating Caps.—8,540, R. Silverwood, Sliding Sashes or Windows.—8,549, R. Stone, Fireproof Plastic Material for Cement.—8,556, E. Stoessel, Electrically-operated Door-chain, &c.—8,557, O. Doozák, Scaffoldings.

MAY 1.—8,577, J. Duckett & Son, Limited, and J. Duckett, Water-closets.—8,601, G. Goddard, Cutting or Trimming Wall-paper and other Materials.—8,623, H. Berger, Wood-planing Machines.—8,646, S. Lesem, Rock Drills.

MAY 2.—8,665, W. Jackson, Fanlight Openers.—8,693, G. Haywood, Ventilators.—8,713, E. Payne, Adjustable Ladder-brackets.—8,729, A. Lewin, Preventing the Closing of the Sashes of French Windows.—8,735, W. Palmer and W. Gibson, Cowl or Ventilator.—8,749, Z. Leroux, Windows.

MAY 3.—8,776, R. Bolton, Chimney-pots.—8,831, H. Foskett, Window-fasteners.

MAY 4.—8,853, W. Nicol Window-sash and Batten-rod

CONTRACTS AND PUBLIC APPOINTMENTS.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Wood Paving	St. George's Vestry, Hanover-square	*Official*	May 21
Wesleyan Church, Delph, Lancs.	.....	W. Waddington & Son	May 22
Four Houses and Shops, Gleadless-road, Heeley, Sheffield	.....	G. A. Wilde	do.
Sewer, King-street and Swan-street, Silsby	Barrow-on-Soar R.S.A.	J. B. Everard	do.
Manse, Portglenone, Ballymena, Ireland	Committee	.....	do.
Improvement Works, St. John's-place, &c.	Halifax Corp.	E. R. S. Escott	May 23
Road Metal	Walker (North'd) Loc. Bd.	T. W. Laycock	do.
Additions, &c. to Schools of All Saints', Cockermouth	.....	R. S. Marsh	do.
Nine Houses, &c. James-street, Barnsley	.....	Wade & Turner	do.
Sewering, Levelling, &c.	Blackpool Corp.	J. Wolstenholme	do.
York Paving, Aberdeen Kerb, &c.	Mile End Old Town Vestry	J. M. Knight	do.
Police Station and Cottages, Latimer-road	Eastbourne Corp.	W. C. Field	May 24
Brick and Pipe Sewers (7,005 yds.)	Skipton U.R.S.A.	A. E. Preston	do.
Granite Spalls and Flints	Gillingham (Kent) Loc. Bd.	*Official*	do.
Waterworks Extension	Cork R.S.A.	do.	do.
Alterations, &c. to Schools, Downsell-road	Wanstead School Bd	J. T. Bressey	May 25
*Fire Engine Station	Walthamstow Loc. Bd.	G. W. Holmes	do.
Drainage Works (10,000 yards)	Macduff (N.B.) T. C.	Jas. Barron	May 26
Offices, Arthur-street, Belfast	Dunville & Co. Lim.	V. Craig	do.
Four Purifiers, &c. at Gasworks	Macclesfield Corp.	*Official*	do.
Vestries at Parish Church, Calverley, Yorks	.....	T. H. & F. Henley	do.
School Buildings, Redcross-street	Bristol Sch. Bd.	E. W. Barnes	May 28
Road Works, Walter-street	West Bromwich Corp.	J. T. Eayrs	do.
Cast-iron Pipes (550 tons)	Rathmines, &c. (Ireland) Impt. Com.	*Official*	do.
Paving, Astley-street	Dukinfield Local Bd	R. Veevers	do.
Forming, Paving, &c. Lancaster-street	Blackburn Corp.	J. B. McCallum	do.
*Tar Pavement	Hendon R.S.A.	.....	do
Abattoirs	West Hartlepool Corp.	J. W. Brown	May 29
Sewerage Purification Works	Failsworth (Lanc.) Loc. Bd.	Lomax & Lomax	do.
*Sewerage Works	St. Luke's Vestry	*Official*	do.
*Additional Engine House to Pumping Station	Southampton Corp.	do.	do.
*Painting, &c. Works at Infirmary	Paddington Guardians	E. H. Sim	do.
Wooden Bridge over Dibbin	Bromborough U.S.A.	J. Clark	do.
Sewerage Works, Nosterfield	Ripon U.R.S.A.	A. E. Preston	do.
*Making-up Roads	Tottenham Loc. Bd.	P. E. Murphy	do.
*Band Stand	do.	do.	do.
*Cast-iron Water Pipes	do.	do.	do.
*Sewage Works	Reigate R.S.A.	J. Anstie	do.
*Distempering, Cleansing, &c. Work	Poplar and Stepney Sick Asylum	G. E. Holman	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Road Materials	Southwark Vestry	— Hiscocks	May 29
Offices and Workshops, Mulcture Hall-road	Halifax Corporation	W. H. D. Horsfall	May 30
Schools, Bopeep, St. Leonards	Hastings U.D. Sch. B.	Elsworthy & Son	May 31
Additions to Schools, Silverhill	do.	do.	do.
Alterations, &c. at Police Station, Aberdare	Glamorgan C. C.	*Official*	do.
Carnarvon Paving Setts (300 tons)	Swinton & Pendlebury (Lancs.) Local Board	do.	do.
*Iron Railings and Gates	Ramsgate Town Coun.	do.	do.
*Branch Public Library	Hull Corporation	do.	do.
*Drainage and Sanitary Works, Workhouse	Greenwich Union	T. Dinwiddy	do.
*Laundry and Heating Apparatus	St. John-at-Hackney Public Bath Com.	Harnor & Pinches	June 1
Reservoir, Pendinas, near Wrexham	Brymbo Water Co.	Dennis & Son	June 2
*100 Cast-iron Lamp Columns	Hornsey Local Board	T. de Courcy Meade	June 4
*Works and Repairs, Manchester District	Com. of H.M. Works	*Official*	do.
*Stoneware Pipe Sewers, &c.	Teddington Local Bd.	H. York	do.
*Electricity and Refuse Destructor Station	St. Pancras Vestry	W. N. Blair	do.
*Gas Engines and Pumps, &c.	Worthing Corp.	J. Mansergh	do.
Technical School, &c.	Neath T. C.	D. M. Jenkins	June 5
Two Iron Bridges, Walls, French Weir Fields	Taunton Corp.	J. H. Smith	do.
*Erection of School Buildings	West Ham Sch. Bd.	Newman & Jaques	do.
Main Drainage (Contract 22)	Manchester Corp.	*Official*	June 7
Additions to Schools	Managers of Newnham-on-Severn Nat. Sch.	W. Spence	June 9
Additions to Dock, St. Andrew, Hull	N. E. Ry. Co.	*Official*	June 13
*Library and Technical School	Borough of St. Helen's	Briggs & Wolstenholme	do.
School Buildings, Penn Mill	Yeovil Sch. Bd.	J. N. Johnston	June 18
Additions to Club Premises	Audenshaw (Lancs.) Conservative Club	J. H. Burton	No date
Vicarage House, Muker-in-Swaledale, Yorks	.....	Chorley & Connon	do.
Ten Cottages and Three Houses, Bower Green, Bradford, Yorks	.....	Jas. Young & Co.	do.
Four Houses, Warkworth, Northumberland	Geo. Thompson	A. R. Hunter	do.
Two Cottages, Farsley, Yorks	.....	H. Hodgson	do.
Offices, Blaydon-on-Tyne	Stella Coal Co.	.....	do.
*Painting, &c. Works, South Aldershot	War Department	*Official*	do.

PUBLIC APPOINTMENT.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Four Diocesan Surveyors	Diocese of York	.....	No date

Those marked with an asterisk (*) are advertised in this Number. Contracts, pp. iv., vi., *and* viii. *Public Appointments, p.* xxi. *and* xxiii.

Fasteners. — 8,876, C. Jones, Water-closet Flushing Cisterns.—8,883, O. Charney, Screws.—8,910, J. Bouhon, Ventilators.

MAY 5.—8,931, G. Gerry, Window and Window Fittings. —8,977, G. Beckert, Building Blocks and Slabs.

PROVISIONAL SPECIFICATIONS ACCEPTED.

2,395, J. Collins and A. Milne, Bolts for Doors.—5,738, A. Vogt, Door Checks.—6,301, C. Monday, New Sash-window.—6,953, A. Ogilvie, Kilns for Burning Lime, &c. —7,092. W. Brighten, Log Band-saw Adjuster.—7,208, A. Jones, Sinks.—7,550, J. Ellis, Sash-bars or Astragals used for Glazing without Putty. 167, J. Bell, Water-closet and Water Waste Preventer.—3,359, H. Clay, Boilers for Kitchen Ranges.—6,543, F. Rechtsteiner.—6,695, J. Trew, Domestic Sanitary Plumbing.—6,807, J. Railton, Junior, Brick Kilns and other Kilns.—6,823, F. Holt, Plumb Rules.—7,312, M. Brophy, Ventilating Hospitals and for Sterilising the Air escaping therefrom.—7,337, J. Tonkin, Door Locks.—7,580, R. Threlfall, Hanging Window Sashes.—7,632, G. Adams, Sashes and Sash Frames.—7,649, A. Stevens, Bakers' Ovens.—7,732, G. Wells, Cowls for Chimneys.—7,765, J. Bates, Kilns.—7,767, M. Lee, Stoves.—7,837, J. Gibbs, Collecting Clear Rain-water from Roofs, &c.—7,915, H. Ford, Window Sashes and Frames. 7,960, N. Tailby, Saw Benches.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

10,483, J. Williams and W. Kempthorne, Metal Casements and Frames.—12,154, R. Knights, Bent Plates used for Bridges, Floors, Buildings, &c.—22,418, D. Buchan, Deodorising and Disinfecting Water-closets, &c.—9,194, W. Hyatt, Paint.—6,104, C. Köster, Veneers.—6,204, A. Leure, Frames for Stained Glass Windows.—6,671, D. Arthur and C. Illingworth, Drainage.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

MAY 3.—By *W. Bradly* (at Woolwich): 11 to 17 odd, Glenside-rd., Plumstead, f., 570*l.*—By *Fuller, Moon, & Fuller* (at Croydon): 34 to 36, Farnley-rd., Norwood, u.t. 85 yrs., g.r. 14*l.*, 56*l.*; 34 to 37, Oval-rd., Croydon, u.t. 72 yrs., g.r. 13*l.*, 87*l.*

MAY 7.—By *Woods & Snelling*: "The Firs," Sidcup, u.t. 75 yrs., g.r. 10*l.*, 85*l.*; No. 141, Hornsey-rd., u.t. 45 yrs., g.r. 6*l.* 6*s.*, 200*l.*—By *Eastman Bros.*: "Northfield" and "Southfield," Tewsbury-rd., Sydenham, u.t. 75 yrs., g.r. 12*l.*, 76*l.*—By *Dunn & Soman*: 34, 36, Norfolk-rd., Dalston, u.t. 67 yrs., g.r. 12*l.*, r. 70*l.*, 600*l.*—By *A. Richards*: F.g.r. of 52*l.* 10*s.*, Commercial-pl., Leyton, reversion in 84 yrs., 1,270*l.*; f.g.r. of 30*l.*, Town Hall-ter-, ditto in 84 yrs., 740*l.*; f.g.r. of 187*l.* 19*s.* 2*d.*, St. George's-rd., ditto in 84 yrs., 5,345*l.*; f.g.r. of 84*l.* 7*s.*, Leyton Pk.-rd., ditto in 84 yrs., 2,050*l.*; f.g.r. of 75*l.* 4*s.*, Beaconsfield-rd., ditto in 84 yrs., 1,895*l.*; six f. cottages and plot of land, Temple Mills, Stratford, f., 1,200*l.*

MAY 8.—By *Brown & West*: 1, 2, Canterbury-ter., Kilburn, u.t. 65 yrs., g.r. 10*l.*, r. 52*l.*, 450*l.*—By *Henry & Latchford*: 48, Jeffrey's-rd., Clapham, u.t. 66 yrs., g.r. 6*l.*, 380*l.*; 8, 9, Listowel-st., Brixton, u.t. 67 yrs., g.r. 9*l.*, r. 65*l.*, 395*l.*; 14, 16, 18, Roundell-st., Wandsworth, u.t. 70 yrs., g.r. 12*l.*, 290*l.*—By *H. V. Chew*: "Emerald House," Cambridge Pk., Wanstead, f., 1,090*l.*—By *A. Booth*: 181, York-rd., Camden-rd., u.t. 49 yrs., g.r. 6*l.*, r. 95*l.*, 1,200*l.*; 4 to 10 (even), Hampshire-st., u.t. 53 yrs., g.r. 21*l.*, 560*l.*; 1, Tabley-rd., Holloway, u.t. 72 yrs., g.r. 7*l.*, 380*l.*; 459, 461, and 463, Caledonian-rd., u.t. 78 yrs., g.r. 57*l.*, 3,300*l.*; 467, Caledonian-rd., u.t. 78 yrs., g.r. 15*s.*, 1,130*l.*—By *Debenham, Tewson, & Co.*: 88, Filey Av., Clapton, u.t. 94 yrs., g.r. 8*l.*, 1,675*l.*; 131, 137, 145, 157, 159, Lower Pk.-rd., Peckham, f., r. 99*l.*, 1,230*l.*—By *Walton & Lea*: 50, Porchester-ter., Hyde Pk. u.t. 44 yrs., g.r. 42*l.*, 5,300*l.*; "The Briars," Fassett-rd., Surbiton, u.t. 69 yrs., g.r. 70*l.*, 500*l.*—By *C. F. Dowsett*: L.g.r. of 15*l.*, Cambridge-gardens, &c., Notting Hill, u.t. 69 yrs., 340*l.*; l.g.r. of 10*l.*, Lancaster-rd., u.t. 69 yrs., 210*l.*; 55, 57, St. Mark's-rd., u.t. 81 yrs., g.r. 1*l.*, r. 90*l.*, 1,100*l.*—By *W. Bradly*: A plot of f. land, High-rd., Wickford, 35*l.*—By *Chinnock, Galsworthy, & Chinnock*: F.g.r. of 7*l.*, Mund-st., Kensington, reversion in 72 yrs., 175*l.*; f.g.r. of 20*l.*, Eli-st., ditto in 86 yrs., 455*l.*; f.g.r. of 50*l.*, Beaumont-rd., ditto in 87 yrs., 1,100*l.*; f.g.r. of 30*l.*, ditto in 84 yrs., 750*l.*

MAY 9.—By *Harman Bros.*: 24, Alderney-rd., Mile-end, u.t. 55 yrs., g.r. 4*l.*, r. 34*l.*, 300*l.*—By *C. Caney*: 1 to 5, Mount Park-ter., Wimbledon, f., 960*l.*—By *Copping & Higgs*: The f. residence "Walfield House," Whetstone, 600*l.*—By *C. P. Whiteley*: "The Grove Place Estate," Jamaica, 3,430 a., f., 4,330*l.*—By *E. Wood*: No. 429, Brixton-rd., u.t. 25 yrs., g.r. 55*l.*, 860*l.*; Four plots of f. land, Elmer's-rd., Penge, 100*l.*; 3, Wendell-rd., Hammersmith, u.t. 77 yrs., g.r. 6*l.*, 245*l.*; 36, 38, Absalom-rd., Westbourne Pk., u.t. 73 yrs., g.r. 14*l.* 10*s.*, 260*l.*—By *Tyser & Co.*: 2 to 6, Belmont-ter., Turnham Green, u.t. 74 yrs., g.r. 25*l.*, 285*l.*; 11 and 13, Warwick Gardens, Kensington, u.t. 54 yrs., g.r. 10*l.*, r. 150*l.*, 1,915*l.*; 15, Warwick Gardens, u.t. 54 yrs., g.r. 7*l.* 10*s.*, r. 170*l.*, 1,600*l.*; 17, Warwick Gardens, u.t. 54 yrs., g.r. 7*l.* 10*s.*, r. 100*l.*, 1,250*l.*; 51, Addison-rd., u.t. 56 yrs., g.r. 8*l.* 10*s.*, r. 90*l.*, 1,080*l.*; 23, 25, Fenelon-rd., u.t. 54 yrs., g.r. 7*l.*, 570*l.*—By *Douglas Young*: No. 357, Clapham-rd., f., r. 75*l.*, 970*l.*—By *Sedgwick, Son, & Weall*: 85, Tufnell-Pk.-rd., Holloway, u.t. 70 yrs., g.r. 8*l.*, 410*l.*; a plot of f. land, 1 a. 1 r. 35 p., Hemel Hempstead, 90*l.*

MAY 10.—By *C. C. & T. Moore*: 125 to 131 (odd), Chobham-rd., Stratford, f., r. 80*l.*, 1,250*l.*; 10 to 16 (even), David-st., f., 800*l.*; f.g.r. of 4*l.*, David-st., reversion in 57 yrs., 95*l.*; 136 to 142 (even), Henniker-rd., u.t. 71 yrs., g.r. 7*l.* 16*s.*, 540*l.*; 47, Western-rd., u.t. 64 yrs., g.r. 2*l.* 10*s.*, 200*l.*; 104, 106, Stebondale-rd., Cubitt Town, u.t. 56 yrs., g.r. 13*l.*, 300*l.*—By *Rogers, Chapman, & Thomas*: I.g.r. of 48*l.*, Hugh-st., Pimlico, u.t. 33 yrs., g.r. 10*l.*, 570*l.*—By *Phillipps, Lea, & Davies*: 88, Narrow-st., Limehouse, u.t. 190 yrs., g.r. 4*l.*, r. 32*l.*, 515*l.*—By *Randall, Beard, & Baker*: 42, Clifton Gardens, Maida Vale, u.t. 54 yrs., g.r. 12*l.*, 550*l.*—By *Farebrother, Ellis, Clark & Co.*: 6, 9, Bermondsey Wall, Bermondsey, area 34,600 ft., f., r. 600*l.*, 7,980*l.*; a plot of f. land, Jacob-st., area 12,500 ft., r. 80*l.*, 1,220*l.*; 72, 74, 75, Mason's Hill, Bromley, u.t. 67 yrs., g.r. 6*l.*, r. 34*l.*, 3,320*l.*—By *Stimson & Sons*: 49, Queen-st., Edgware-rd., f., r. 50*l.*, 760*l.*; warehouse, Rose-ct., St. Luke's, u.t. 78 yrs., g.r. 46*l.*, r. 150*l.*, 875*l.*; 245 to 251 odd, St. George's-rd., Peckham, u.t. 67 yrs., g.r. 14*l.*, 740*l.*; 56, Chaucer-rd., Herne Hill, u.t. 76 yrs., g.r. 6*l.*, r. 30*l.*, 255*l.*; 37 to 45 odd, Louth-rd., Camberwell, u.t. 20 yrs., g.r. 10*l.*, r. 149*l.*, 760*l.*; 51, Stanley-rd., u.t. 82 yrs., g.r. 6*l.* 6*s.*, r. 36*l.*, 480*l.*; 59, 61, Wells-st., u.t. 29 yrs., g.r. 9*l.*, r. 76*l.*, 475*l.*; 119, 121, 123, Flaxman-rd.; and 2 to 7, Redan-ter., u.t. 17 yrs., g.r. 36*l.*, 520*l.*; 8 to 16, Redan-ter., u.t. 17 yrs., g.r. 36*l.*, 500*l.*; 27 to 35 odd, Etruria-st., Wandsworth, u.t. 68 yrs., g.r. 18*l.*, 470*l.*; 28 to 36 even, Etruria-st., u.t. 67 yrs., g.r. 17*l.* 10*s.*, 400*l.*—By *Newbon & Co.*: 21, 22, Accacia-rd., Green Lanes, u.t. 81 yrs., g.r. 10*l.*, 240*l.*; No. 30, Canonbury-pk. South, u.t. 42 yrs., g.r. 8*l.*, 525*l.*; No. 27, Improved Rental of 50*l.*, Camden-rd., u.t. 42 yrs., 880*l.*; l.g.r. of 50*l.*, u.t. 42 yrs., 910*l.*; 28, Torriano-av., u.t. 49 yrs., g.r. 6*l.*, r. 40*l.*, 320*l.*; 32, Kenton-rd., Hackney, u.t. 56 yrs., g.r. 14*s.*, r. 28*l.*, 310*l.*; 31, Regina-rd., Holloway, u.t. 68 yrs., g.r. 5*l.*, r. 33*l.*, 285*l.*; 65, Plimsoll-rd., u.t. 82 yrs., g.r. 6*l.* 6*s.*, r. 30*l.*, 280*l.*; 138, 140, Marlborough-rd., u.t. 68 yrs., g.r. 12*l.*, r. 52*l.*, 355*l.*; 92, 94, Northumberland Pk., Tottenham, u.t. 72 yrs., g.r. 8*l.*, r. 52*l.*, 425*l.*; 68, Myddleton-sq., Pentonville, u.t. 18 yrs., g.r. 10*l.*, r. 60*l.*, 250*l.*; 34, Lloyd's Row, Clerkenwell, u.t. 37 yrs., g.r. 12*l.* 12*s.*, 170*l.*; 15, 17, 19, Ritchings Av., Walthamstow, u.t. 90 yrs., g.r. 8*l.* 5*s.*, 270*l.*; 38, Hervey Pk.-rd., u.t. 92 yrs., g.r. 4*l.*, 75*l.*; 18, Courthill-rd., Lewisham, u.t. 72 yrs., g.r. 6*l.*, r. 30*l.*, 220*l.*; 2, 4, 6, Wyndford-rd., Caledonian-rd., and 1, 2, 3, Thornhill Cottages, u.t. 30 yrs., g.r. 30*l.*, 390*l.*—By *H. J. Bliss & Sons*: 90, 92, Studley-rd., Forest Gate, f., 540*l.*; 34, 36, 38, St. Stephen's-rd., Bow, f., r. 106*l.*, 1,490*l.*; 27, St. Stephen's-rd., u.t. 59 yrs., g.r. 4*l.* 4*s.*, 330*l.*; 59, Wenlock-st., Hoxton, u.t. 48 yrs., g.r. 4*l.* 4*s.*, r. 32*l.*, 300*l.*; 135, Coventry-st., Bethnal Green, f., 240*l.*; 6, Peel-grove, u.t. 944 yrs., g.r. 3*l.*, 320*l.*; 17, Scrutton-st., Finsbury, f., r. 32*l.*, 600*l.*; 7 to 17 (odd), Grange-rd., Plaistow, f., 825*l.*; 187 to 197 odd, Leyton-rd., Stratford, u.t. 59 yrs., g.r. 25*l.*, 600*l.*; 328, 330, Old Ford-rd., Victoria-Pk., u.t. 60 yrs., g.r. 8*l.*, 725*l.*; 342, Old Ford-rd., u.t. 60 yrs. g.r. 4*l.*, r. 30*l.*, 300*l.*—69, Grafton-st., Mile End, u.t. 35 yrs., g.r. 2*l.* 10*s.*, 260.

MAY 11.—By *W Simmonds*: 100, 102, Denmark-st., Camberwell, f., 850*l.*—By *T. B. Westcott*: 16, Grafton-rd., Kentish Town, u.t. 27 yrs., g.r. 5*l.*, r. 40*l.*, 300*l.*; 25, Patshull-rd., u.t. 67 yrs., g.r. 6*l.* 10*s.*, r. 52*l.* 10*s.*, 575*l.* —By *Moss & Jameson*: 339, Milkwood-rd. Herne Hill, u.t. 81 yrs., g.r. 7*l.*, 400*l.*

[*Contractions used in these Lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street.; rd. for road; sq. for square; pl. for place; ter. for terrace cres. for crescent yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.

Greenheart, B.G.	ton	8/0/0 0/0/0
Teak, E.I.	load	10/0/0 16/0/0
Sequoia, U.S.ft.cu		2/3 2/6
Ash, Canada	load	2/15/0 4/0/0
Birch, do.		2/5/0 3/10/0
Elm, do.		3/10/0 4/15/0
Fir, Dantsic, &c.		2/5/0 3/5/0
Oak, do.		2/10/0 4/15/0
Canada		5/10/0 7/0/0
Pine, Canada red		2/10/0 3/0/0
Do. Yellow		2/10/0 4/15/0
Lath, Dantsic, fath		4/10/0 5/10/0
St. Petersburg		5/0/0 6/10/0
Wainscot, Riga, &c., log		2/5/0 4/10/0
Odessa, crown		2/5/0 4/10/0
Deals, Finland		
2nd & 1st std 100		8/0/0 10/10/0
Do. 4th & 3rd		7/10/0 9/0/0
Do. Riga		7/10/0 9/0/0
St. Petersburg, 1st yellow		10/0/0 13/10/0
Do. 2nd yellow		8/0/0 9/0/0
Do. white		8/10/0 11/0/0
Swedish		8/10/0 16/10/0
White Sea		8/0/0 16/10/0
Canada, Pine 1st		22/10/0 99/0/0
Do. do. 2nd		17/0/0 18/0/0
Do. do. 3rd, &c.		9/10/0 10/5/0
Do. Spruce, 1st		9/0/0 11/0/0
Do. do. 3rd & 2nd		6/10/0 7/10/0
New Brunswick		6/0/0 7/5/0
Battens, all kinds		3/0/0 15/0/0
Flooring boards, sq., 1 in. prep. 1st		0/10/0 0/15/0
Do. 2nd		0/7/6 0/12/0
Other qualities—		0/5/0 0/7/0
Cedar, Cuba	ft.	/3½ /4½
Honduras, &c.		/3½ /4½
Mahogany, Cuba		/3½ /6
St. Domingo, cargo av.		/3 1/6
Mexican do. do.		/3 /4
Tobasco do. do.		/3½ /6
Honduras do.		/3½ /5½
Box, Turkey	ton	4/0/0 13/0/0
Rose, Rio		7/0/0 18/0/0
Bahia		6/0/0 17/0/0
Satin, St. Domingo		0/0/5 0/1/0

TIMBER (*continued*).

Satin, Porto Rico		0/0/6 0/1/6
Walnut, Italian		0/0/3½ 0/0/7

METALS.

Iron—Pig, in Scotland	ton	2/1/7½ 0/0/0
Bar, Welsh, in London		5/17/6 6/0/0
Do. do. at works in Wales		5/7/6 5/10/0
Do. Staffordshire, in London		6/0/0 6/10/0
COPPER—British cake and ingot		41/15/0 42/5/0
Best selected		42/15/0 43/5/0
Sheets, strong		51/0/0 0/0/0
Chili, bars		39/15/0 40/0/0
YELLOW METAL	lb	0/0/4½ 0/0/5
LEAD—Pig, Spanish	ton	9/0/0 9/2/6
English com. brands		9/2/6 9/3/9
Sheet, English, 6 lbs. per sq. ft. and upwards		10/15/0 0/0/0
Pipe		11/5/0 0/0/0
ZINC—English sheet	ton	19/0/0 19/0/0
Vieille Montagne		19/10/0 0/0/0
TIN—Straits		71/10/0 72/0/0
Australian		72/0/0 73/0/0
English Ingots		76/0/0 76/10/0
Banca		76/10/0 77/0/0
Billiton		72/10/0 73/0/0

OILS.

Linseed	ton	20/15/0 21/0/0
Cocoanut, Cochin		28/10/0 29/0/0
Do. Ceylon		24/5/0 24/10/0
Palm, Lagos		23 10/0 0/0/0
Rapeseed, English pale		21/10/0 22/0/0
Do. brown		19/15/0 0/0/0
Cottonseed ref.		21/10/0 22/0/0
Oleine		22 0 0 24/0/0
Lubricating, U.S.		4/0/0 5/0/0
Do. refined		5/0/0 23/0/0
TAR—Stockholm	barrel	0/22/0 0/0/0
Archangel		0/11/0 0/0/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.*]

ASHFORD.—For the supply and delivery of 1,240 cubic yards of 2inch broken granite, for the Local Board. Mr. William Terrill, Surveyor, North-street, Ashford, Kent:—

—	Railway Station.	Price per Ton.	Price per Cubic Yard.	Description of Granite.
		s. d.	s. d.	
Enderby Granite Co.	S.E.R.	13 2	—	Enderby or
	L.C.D	13 2	—	Stoney Stanton.
R. L. & J. Fennings	S.E.R.	—	17 3	Guernsey.
	L.C.D.	—	19 8	,,
Griff Granite Co.	S.E.R.	—	15 8	Blue Griff.
	L.C.D.	—	15 8	,,
A. Hutson	S.E.R.	—	15 2	Alderney, Port
	L.C.D.	—	16 4½	of Guernsey.
The Kent Road Maintenance and Stone Co.	S.E.R.	—	14 11	Cherbourg
	L.C.D.	—	17 3	Quartzite.
C. M. Manuelle	S.E.R.	—	14 3	Quenast.
	L.C.D.	—	15 3	,,
Wm. Muir & Co.	S.E.R.	—	—	
	L.C.D.	—	—	
William Griffiths	S.E.R.	—	16 3	Guernsey.
	L.C.D.	—	19 7	,,
Nowell & Co.	S.E.R.	16 6	—	Narborough.
	L.C.D.	12 11	—	,,
Somerfield & Co.	S.E.R.	—	13 6	Lessine's
	L.C.D.	—	14 10	,,
,, ,,	S.E.R.	—	14 9	Cherbourg
	L.C.D.	—	16 1	Quartzite.
S. Trickett & Sons	S.E.R.	—	15 4	St. Ive's Elvan
	L.C.D.	—	—	
Van Praagh & Co.	S.E.R.	17 0	—	Cliff Hill
	L.C.D.	17 0	—	,,
The Whitwick Granite Co., *Coalville, near Leicester	S.E.R.	—	11 10	Whitwick.
	L.C.D.	—	11 10	,,
J. L. Lyon & Co.	S.E.R.	—	18 3	Basalt.
	L.C.D.	—	18 3	,,
Vidler & Sons	S.E.R.	—	14 9	Cherbourg
	L.C.D.	—	—	Quartzite
Jesse Ellis & Co.	S.E.R.	—	19 3	,,
	L.C.D.	—	19 9	
C. M. Manuelle	S.E.R.	—	13 8	Belgian.
	L.C.D.	—	14 8	,,

* Accepted.

BECKENHAM.—For channelling, &c., Beckenham-road, for the Local Board. Mr. J. A. Angell, C.E., Local Board Offices, Beckenham. Quantities by Engineer:—

Fry Bros.	£1,265 0 0	Messrs. Mowlem & Co., Westminster*	£1,011 0 0
T. Adams	1,156 8 4		
T. Spencer	1,079 19 4		

*Recommended for acceptance.

BOGNOR (Sussex).—For the construction of sea-defence works 800 ft.), with railing, lamps, &c., and four concrete groynes, for the Local Board. Mr. Wm. Lewis Barrett, C.E., High-street, Bognor:—

Dix & Silverton	£23,642 7 1	William Tate, Bognor*	£4,695 0 1
Jas. Dickson	5,450 0		

* Accepted.

BOWNESS-ON-SOLWAY.—For the erection of a sea-wall in cement, concrete, and stone, for the Wigton Highway Board. Mr. J. Sibson, Surveyor, Wigton:—

Dix & Silverston	£340 0 0	W. R. Purdam	£331 0 0
J. & W. Baty	330 0 0	N. Harrison	198 12 0
T. Harrison	325 0 0	T. Longcake, Silloth, Cumberland*	191 15 6
William Moor	284 15 0		
Surveyor's estimate			£261 0 0
Add 10 per cent.			26 0 0
Total			287 0 0

* Accepted.

BURTON-UPON-TRENT.—For the construction of a suction culvert, screen house, overflow-chamber, sewer, &c., at Stretton, for the Corporation. Mr. J. E. Swindlehurst, Borough Engineer and Surveyor, Burton-upon-Trent:—

T. Philbrick	£2,481 8 9	Jones & Fitzmaurice, Browning-street, Birmingham*	£2,090 0 0
A. & E. Bentley	2,137 8 0		
G. Hodges	2,132 8 0		

* Accepted.

BUSHBURY.—For alterations and additions to the National Schools. Messrs. J. R. Veal & Son, architects, Wolverhampton:—

J. Reynolds	£211 6	J. Bilson, Wolverhampton (accepted)	£191 11

CORK.—Accpted for the erection of chapel and house of retreat, at the Convent of Marie Repartrice. Mr. S. F. Heynes, architect, 41, South Mall, Cork:—

E. & P. O'Flynn, Watercourse-road, Cork £2,982 0 0

CROYDON.—For roadworks, Cavendish and four other roads, for the Town Council. Mr. W. Powell, Borough Road Surveyor, 8, Katharine-street, Croydon:—

Chatfield-road.

Benstead & Lake	£451 7 10	H. Lake	£390 10 2
E. W. Iles & Co.	420 0 0	A. Bullock, Tanfield-road, Croydon*	388 15 10½
J. Mowlem & Co.	408 0 0		

Cavendish-road.

Benstead & Lake	£309 9 7	H. Lake	£269 10 9
E. W. Iles & Co.	299 8 2	A. Bullock, Tanfield-road, Croydon*	266 12 8½
J. Mowlem & Co.	278 0 0		

Crowther-road.

Benstead & Lake	£303 12 2	H. Lake	£278 8 10
D. Marchu	295 11 8	J. Mowlem & Co., Westminster*	272 0 0
E. W. Iles & Co.	283 0 0		
A. Bullock	282 3 1		

Stanger road.

D. Marchu	£590 8 2	J. Mowlem & Co., Westminster*	£548 0 0
E. W. Iles & Co.	566 0 0	Benstead & Lake	533 10 7½
A. Bullock	557 1 2		
H. Lake	554 19 0		

Talbot-road.

Benstead & Lake	£222 5 2	A. Bullock	£192 3 3
E. W. Iles & Co.	221 0 0	H. Lake, Princess-road, Croydon*	190 14 3
J. Mowlem & Co.	196 0 0		

* Accepted.

CASTLEFORD (Yorks.).—For the erection of a residence, Ferrybridge-road, for Dr. Kemp, J.P. Mr. R. M. McDowall, architect, 17, Carlton-street, Castleford. Quantities by the architect:—

Bricklayer and Mason.—William Walker, Castleford	£432 8 9
Carpenter and Joiner.—J. H. Whaley, Castleford	279 8 0
Slater.—S. Evison, Castleford	50 0 0
Plasterer.—F. H. Marsden, Knottingley	63 0 0
Plumber and Glazier.—R. Nicholson, Castleford	123 13 3
Painter.—A. Firth, Castleford	20 0 0
Total	968 10 0

DORKING.—For forming, kerbing, &c., Lincoln-road, for the Local Board. Mr. G. Somers Mathews, C.E., surveyor, Dorking:—

J. A. Jeal	£885 0	W. Meats	£365 0
G. S. Faulkner	371 10	G. A. Franks, Guildford*	357 15
A. P. Clear	370 0		

* Accepted.

DOVERCOURT.—For the erection of a sea-wall at the "Phœnix" Hotel, Dovercourt, Essex, for Messrs. Daniell & Sons. Mr. J. W. Start, architect and civil engineer, Cups Chambers, Colchester and Harwich:—

H. Stone	£730 0	H. Plummer	£534 0
B. W. Garwood	700 0	E. Sanders	525 0
E. West	633 0	T. Canham	422 15
J. Band	576 0	Smith, Beaumont, & Dawson, Harwich (too late)	391 0
Girling & Coe	555 0		
J. Moran & Son, Harwich*	540 0		

* Accepted in part.

EASTLEIGH (Hants.).—For laying a 12-in. iron and stoneware effluent pipe (three miles) to the River Itchen, at Wood Mill. Mr. H. J. Weston, C.E., 24, Portland-street, Southampton:—

F. Reeks	£4,524 0	D. H. Porter	£3,150 0
Peattie & Axtell	3,852 0	H. W. Bull	2,903 0
Playfair & Toole	3,448 0	Crook & Batten	2,897 10
Cooke & Co.	3,390 0		

[Engineer's estimate, £3,140 os. od.]

ECCLESALL (Yorks.).—Accepted for the erection of business premises, Fawcett- and Bellefield-streets, for the Ecclesall Industrial and Provident Society, Limited. Mr. Jas. Hall, architect, 10, Paradise-square, Ecclesall. Quantities by the architect:—

Mason.—John Morton, John-street	£870 0 0
Joiner.—C. H. Gillam, Langdon-street	368 15 0
Slaters.—Ellis & Wetherill, Broomhall-street	40 0 0
Paiserers.—Unwin & Sons, Earsham-street	59 0 0
Plumber.—Jno. Rule, Yardley-street	78 0 0
Painter.—Jno. Clark, St. Mary's-road	28 10 0

[All of Sheffield.]

FERNHURST (Sussex).—For additions, &c., to school buildings, for the Fernhurst School Board. Mr. James Hill, architect:—

Harding Bros.	£181 18 0	Wm. Chase, Fernhurst*	£152 5 0
B. Slade	160 10 5		
F. Gale	159 0 0		

* Accepted.

GLOUCESTER.—For the erection of wrought-iron lattice girder footbridge (43-ft. span) over Midland Railway Docks, for the Corporation of Gloucester. Mr. R. Read A.M.Inst.C.E., City Surveyor, Guildhall, Gloucester. Quantities by Surveyor:—

G. Smith & Son	£653	T. Dyne Steel	£412
,, ,, (own patterns)	467	Lysaght & Co.	398
Brettall	612	Cruwys & Hobrough, Gloucester (accepted)	397
Richards	429		

GOLBORNE (Lancs.).—For the reconstruction of Harvey-lane Bridge, for the Parochial Committee. Mr. Chas. S. Bennie, Surveyor, Parochial Offices, Golborne, near Newton-le-Willows:—

Peter Ashcroft	£375 5 0	Hy. C. Roff	£291 1 0
Willm. Winnard	264 11 0	Wilcox & Braddock, Platt Bridge, near Wigan (accepted)	181 11 8
John Preston	245 8 3		
Wm. Gaskell	230 12 4		

GRIMSBY.—For the execution of street works, for the Cleethorpes Local Board. Mr. T. Rowland, C.E., Town Hall, Louth. Quantities by Engineer:—

C. Adlard	£894 13 6	C. A. Walker	£541 18 6
Thompson & Son	807 0 0	Geo. Walker, Kent House, Wortley-lane, Leeds*	528 15 0
J. H. Vickers	695 18 7		
Thos. Mason	681 17 2		
R. Hopkinson	643 12 0	Sharman & Son	510 6 9
Brunton & Son	599 12 4		

* Accepted.

[Engineer's estimate, £617 18s. 7d.]

HALIFAX.—Accepted for the erection of stable, &c., Pellon-lane. Messrs. Jackson & Fox, architects, Halifax:—

Mason.—Riley Hopkinson	£148 5 0
Joiner.—H. Taylor	48 10 0
Slaters.—Rushworth & Firth	20 0 0
Plumbers.—Cragg & Turner	8 19 0

[All of Halifax.]

HASTINGS.—For the supply of 1,000 tons Guernsey granite spalls, for the Corporation. Mr. P. H. Palmer, C.E., Town Hall, Hastings:—

	s. d.		s. d.
C. Abell	13 6	J. Mowlem & Co.	12 0
R. L. & J. Fennings	12 6	Vidler & Sons, Rye*	11 10
W. Griffiths	12 3		
A. & F. Manuelle	12 2		

* Accepted.

HUNSTANTON.—For the erection of villa residence. Messrs. George Fitt & Co., architect, Queen-street, Norwich. Quantities by architects:—

W. H. Brown	£1,398	E. Girling & Co.	£1,190
Young & Co.	1,350	Collins & Barber	1,175
Melton & Jarvis	1,250	J. Nelson	1,150
W. Butt, jun.	1,247	S. Hipwell	1,075

JARROW.—For laying footpaths and channelling Croft-terrace, Monkton-terrace, Borough-road, &c., for the Urban Sanitary Authority. Mr. J. Petree, Borough Surveyor, Jarrow:—

G. Maughan	£782 16 1
T. Callaghan, 34, Staple-road*	763 11 6

*Accepted.

[Borough Engineer's estimate £775 2 5.]

LANCHESTER.—For the execution of sewerage works (1) at Annfield Plain and district; and (2) Cronywell and Westwood's, (3) Burnoffield sewers, for the Union Rural Sanitary Authority. Mr. J. E. Parker, C.E., Union Offices, Lanchester:—

(1) Geo. Robson, 6, Ridley-villas, Newcastle	£1,368 0 0
(2) E. & J. K. Taylor, The Avenue, Durham*	1,162 0 0
(3) Geo. Robson, 6, Ridley-villas, Newcastle*	561 9 10

*Accepted.

LLANDRINDOD WELLS. — For restoration of the Parish Church, for the Venerable Archdeacon de Winton. Messrs. W. & T. Williams, architects, Brecon:—

S. W. Deakins	£907 0	James Webb	£895 0
Robert E. Davies	920 10		

LLANDRINDOD WELLS. — For restoration of Cefnllys Parish Church, for the Venerable Archdeacon de Winton. Messrs. W. & T. Williams, architects, Brecon:—

Robert E. Davies	£1,385	S. W. Deakins	£1,350

LLANGEINOR (Wales).—For the extension of school buildings, Ffaldan, Pontycymmer, for the School Board. Mr. P. J. Thomas, architect, Bridgend. Quantities by architect:—

John Rees	£4,700	Chas. James	£4,000
W. Lissaman	4,655	Rattray & Jenkins, Pontycymer, near Bridgend (accepted)	3,863
Thomas Roberts	4,450		
Philip Gaylard	4,425		
F. Small	4,270		

LONDON.—For alterations and additions to 174, Carlton-road, Haverstock Hill, N.W. Mr. J. Randall Vining, architect and surveyor:—

John Allen & Sons	£385 0	J. & C. Bowyer	£331 0
W. Johnson & Co.	340 0	Howard & Co.	328 10
Dove & Beveridge	337 0	A. H. Tout (accepted)	326 0

LONDON.—For alterations and additions to Hill House, Streatham. Mr. J. Randall Vining, architect and surveyor:—

W. Johnson & Co.	£303 10	J. & C. Bowyer*	£230 0
A. Black & Son	251 0		

* Accepted.

LONDON.—For caretaker's house and shelter, for the parish of St. Mary's, Islington. Mr. J. Douglass Mathews, architect, 11, Dowgate Hill, E.C.:—

		Less if in Stock Bricks.
Wall	£1,495	£144
Stevens Bros.	1,360	160
Lascells	1,340	96
Colman	1,332	130
Lidstone	1,320	136
Wells	1,304	173
Town & Son	1,292	80
Lawrance & Son	1,280	110
McFarlane	1,260	155
Ward & Lamble	1,257	130
Peck	1,240	105
White & Son	1,179	144
Goodall	1,140	109
Marchant & Hirst	1,129	130
Linfield	1,086	130

LONDON.—For repairs to twelve houses, Coutts and Canal-road, Mile End-road, Paul's Estate. Mr. William Stone, architect and surveyor, 2, Great Winchester-street, E.C.:—

Higgs	£723	Edwards*	£593
Beale	660		

*Accepted.

LONDON.—For repairs to 80, Church-street, Bethnal-green, Paul's Estate. Mr. William Stone, architect and surveyor, 2, Great Winchester-street, E.C.:

Higgs	£406 10	Thomerson & Sons	£361 1
Knight & Sons	375 0	Wire & Forrest	201 0
Edwards	364 0		

LONDON.—For rebuilding 194 and 196, Bethnal Green-road, and 1, Fuller, for Messrs. Learoyd & Blont. Mr. William Stone, architect and surveyor, 2, Great Winchester-street, E.C.:—

Thomerson & Sons	£1,395	Higgs	£1,169
Beale	1,258	Steed	1,119
Jarvis & Sons	1,235	Knight & Sons (accepted)	1,010

LONDON.—For alteration to "Lord Palmerston" public-house, Hewlett-road, Old Ford, for Messrs. Taylor, Walker, & Co. Mr. William Stone, architect and surveyor, 2, Great Winchester-street, E.C.:—

Johnson (accepted)	£512	Higgs	£490

LONDON.—For sanitary work at the Grammar School, Tottenham. Mr. Alfred Richards, surveyor, 18, Finsbury-circus, E.C.:—

Wilson & Co.	£125	M. A. Humphreys & Son*	£104
H. Knight & Son	110		

* Accepted.

LOUTH (Lincs.).—For the execution of drainage and sewage works, for the Sanitary Authority. Mr. E. Rowland, C.E., Town Hall, Louth. Quantities by Engineer:—

Wm. Nicholson	£1,662 5 3	C. Adlard & Miller	£964 18 0
J. Cooke	1,214 8 11	T. Mason, Hebden-bridge, near Manchester (accepted)	852 2 6
R. Mawer	1,211 15 6		
J. H. Vickers	1,184 4 9		
A. Harrison	1,100 14 6	R. Hopkinson	769 13 0

[Engineer's estimate, £917.]

MACCLESFIELD.—Accepted for the erection of an isolation hospital in the workhouse grounds, for the Union Guardians. Mr. W. Aston, architect, King Edward-street, Macclesfield:—

John Clayton, Sunderland-street, Macclesfield..£1,050 0 0

NORTH SHIELDS.—For the construction of a timber jetty, Low Lights, for the Corporation of Tynemouth. Mr. Jno. F. Smillie, Borough Surveyor, Tynemouth. Quantities by the Borough Surveyor:—

John Jackson	£12,493 0 0	William Gradwell & Co.	£10,000 0 0
George Lawson & Son	11,152 6 9	D. N. Brims, Newcastle-on-Tyne*	8,418 7 0
A. G. McGregor	10,700 0 0		

* Accepted.

NORWICH.—For kerbing, paving, channelling, &c., two new roads, Trafford Building Estate, Lakenham. Messrs. Geo. Fitt & Co., surveyors, 1, Queen-street, Norwich. Quantities by surveyor:—

J. Botterill	£1,381	J. Hurn, Grove-road, Norwich (accepted)	£736
S. Hipwell	825		

PERRANPORTH (Cornwall.)—For the erection of a villa residence for Captain R. R. Nancarrow. Mr. Sampson Hill, architect, Redruth:—

Whole.

Shipman	£866 0	J. Higgins	£630 0
J. Julian	845 0	T. H. Robins, Perranporth (accepted)	632 12
Tayler Bros.	768 10		

Masonry.

S. Head	£470 0	W. H. Gray	£440 10

Carpentery.

W. H. Moyle	£358 0	C. Hodge	£353 0

PONTYPRIDD.—For additions, &c., to school buildings, Treforest and Llantwit, for the Llantwit Fardre School Board. Mr. A. O. Evans, architect, Town Hall Chambers, Pontypridd:—

Treforest Schools.

D. C. Jones & Co.	£1,539	M. Julian	£1,289
Alfred Richards	1,409	Williams & James	1,287
Watkin Williams	1,400	David Jones, Treforest*	1,259

* Accepted.

Llantwit Schools.

David Jones	£423 11 6	Jas. Williams, Ponty-	
M. Julian	395 0 0	pridd (accepted)	£375 17 9

PONTYPRIDD.—For additions to school buildings, Porth, for the Llanwonno School Board. Mr. A. O. Evans, architect, Town Hall Chambers, Pontypridd:—

Watkin Williams	£928	Jenkins & Son, Porth*	£772
E. George	785		

* Accepted.

PRESTON.—For the erection of a house at Wrigan House Farm, Sharoe Green-lane, Fulwood, for the Union Guardians. Mr. Whitwell, Engineer, the Workhouse, Fulwood, Preston:—

Turners	£619 17 6	Lucas	£594 16 6
Foxackerby	618 13 4	M. Shorrock	588 10 0
T. Strickland	610 0 0	J. Counsell	586 15 9
J. Swarbrick	600 0 0	J. Marland	585 15 8
Baldwin	600 0 0	Carter Bros., Preston*	567 0 0
Thos. Baines	599 16 4		

* Accepted.

QUEENSTOWN (Ireland).—For works in improving south side of Queen-street, removing old houses, &c., for the Town Commissioners. Mr. John Ohern, Surveyor, Town Hall, Queenstown:—

John Kilty	£746 10	James O'Keeffe, Roches-	
R. Johnston, C.E.	640 8	row, Queenstown*	£495 0
John Mackey	535 0		

* Accepted.

RICHMOND (Surrey).—Accepted for the execution of street works in various parts of the borough, for the Town Council. Mr. E. J. Lovegrove, C.E., Borough Surveyor, Town Hall, Richmond:—

		Surveyor's estimate.
Benn's Cottages.		
Nowell & Robson, Warwick-road, Kensington	£66 0 0	£65 19 4
Perseverance Place.		
Nowell & Robson	£52 0 0	£44 10 1
Sheenvale Cottages.		
Nowell & Robson	£27 0 0	£21 11 9
Stafford Mews.		
Nowell & Robson	£122 0 0	£128 1 9
St. James's Cottages.		
Nowell & Robson	£198 0 0	£205 18 0
Warrington-road.		
Nowell & Robson	£179 0 0	£185 0 0
Wellington Place.		
Nowell & Robson	£40 0 0	£38 5 11
Castle Yard.		
Nowell & Robson	£124 0 0	£123 16 5
Cedar Terrace.		
Nowell & Robson	£439 0 0	£462 15 8
Lawn Crescent.		
Nowell & Robson	£787 0 0	£794 8 2

SALTASH.—For the erection of new school buildings, for the School Board. Mr. H. J. Snell, architect, 13, Courtenay-street, Plymouth. Quantities by the architect:—

Payne	£3,157	Harvey	£2,827
Berry	3,073	Paynter & Davy	2,826
Blowey	3,050	Turpin	2,817
Kerswill	3,041	Andrews	2,806
W. G. Goad	3,000	Finch	2,820
May	2,925	J. Goad & Co.	2,799
Blake	2,924	Westlake & Waldron	2,763
Tozer & Son	2,922	Lapthorn	2,740
Partridge	2,899	Julian	2,488

SALTASH.—For alterations to existing school buildings, for the School Board. Mr. H. J. Snell, architect. Quantities by the architect:—

Payne	£1,736 0 0	Paynter & Davy	£1,329 15 6
Berry	1,727 0 0	Turpin	1,325 0 0
Blowey	1,539 0 0	Blake	1,314 0 0
Tozer & Son	1,399 10 0	Andrews	1,314 0 0
May	1,398 0 0	W. G. Goad	1,300 0 0
Westlake & Waldron	1,388 0 0	Lapthorn	1,293 0 0
Partridge	1,345 0 0	Julian	1,288 0 0
Harvey	1,335 0 0	Kerswill	1,286 0 0
Finch	1,331 0 0	J. Goad & Co.	1,197 0 0

TETBURY (Gloucestershire).—For the restoration of Higrove Mansion, Tetbury, Glos.:—

Humphries & Son	£6,590	W. Jones	£5,940
Collins & Godfrey	6,470	Hatherly & Carr	5,897
Wall & Hook	6,400	Cowlin & Son*	5,863
Drew Bros.	6,000		

* Accepted.

WELLINGBOROUH.—For the erection of a shop, High-street, for Mr. Wm. Pendered. Mr. Edwd. Sharman, architect, Croyland Abbey, Wellingborough:—

Wm. Goodman	£389 19	J. Underwood	£342 0
T. H. Dorman	379 0	E. Brown & Son,	
Wm. Stevens	355 0	Wellingborough*	338 0
Hacksley Bros.	352 19		

* Accepted.

WHITBY.—For alterations to the "Black Horse" Hotel, Church-street, for Messrs. Young & Co. Mr. Robt. Lennard, architect, Cliff-street, Whitby. Quantities by Mr. J. Jackson Milligan:—

J. Russell	£222 9	W. Chapman	£166 5
Langdale & Sons	191 19	A. Palframan, Whitby*	165 17
R. Harland	178 10		

* Accepted.

WOLVERHAMPTON.—For the erection of the Queen Victoria Nursing Institution. Messrs. J. R. Veall & Son, architects, Wolverhampton:—

H. Gough	£3,750	Willcock & Co.*	£3,464
H. Lovatt	3,610		

* Accepted.

WREXHAM.—For additions to school buildings, Tabor Hill, Penygelli, for the Bersham (U.D.) School Board. Mr. John Ebenezer Lash, architect, Garth, Llangollen. Quantities by architect:—

Wm. E. Samuel	£1,398 0 0	Edward Bird	£1,150 0 0
James Hughes	1,300 0 0	Edward Bradshaw	1,140 0 0
William Owen	1,275 5 2	Samuel Moss, Coed-	
William Rogers	1,265 0 0	poeth, Wrexham*	1,125 7 5
Jas. Whittingham	1,258 10 0		
John Harrison & Thos. Griffiths	1,172 0 0		

* Accepted.

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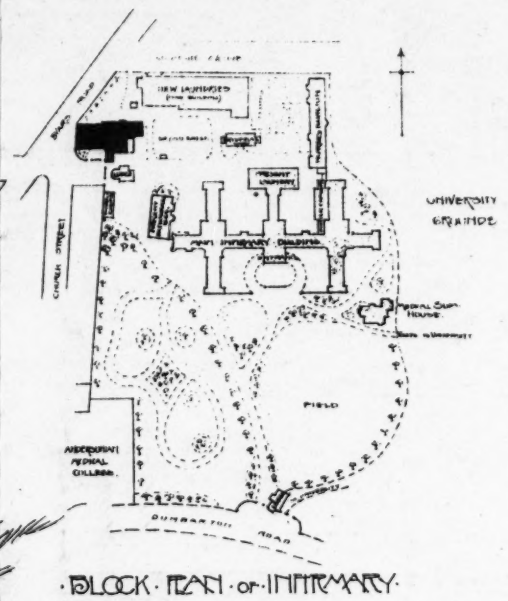

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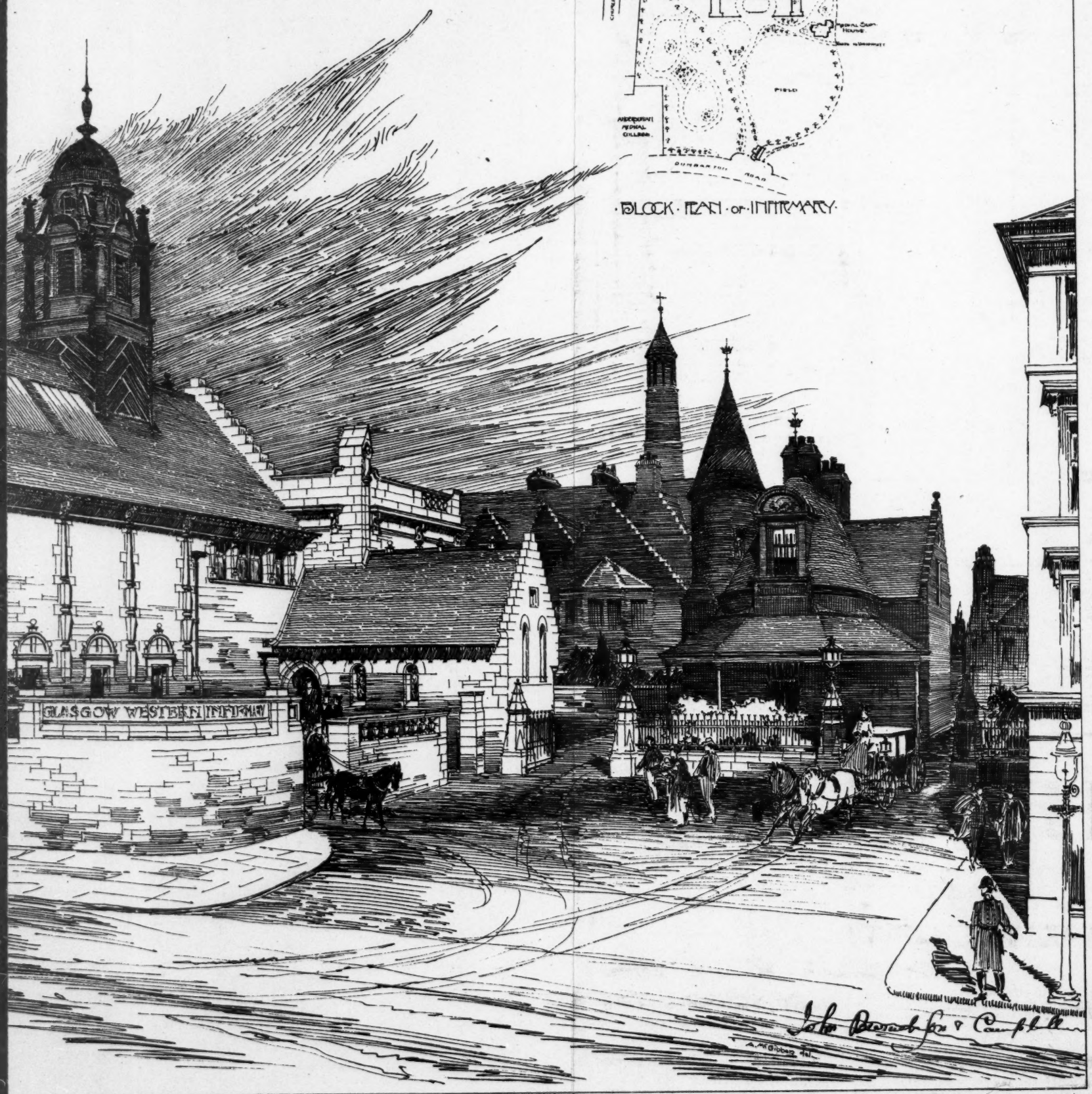

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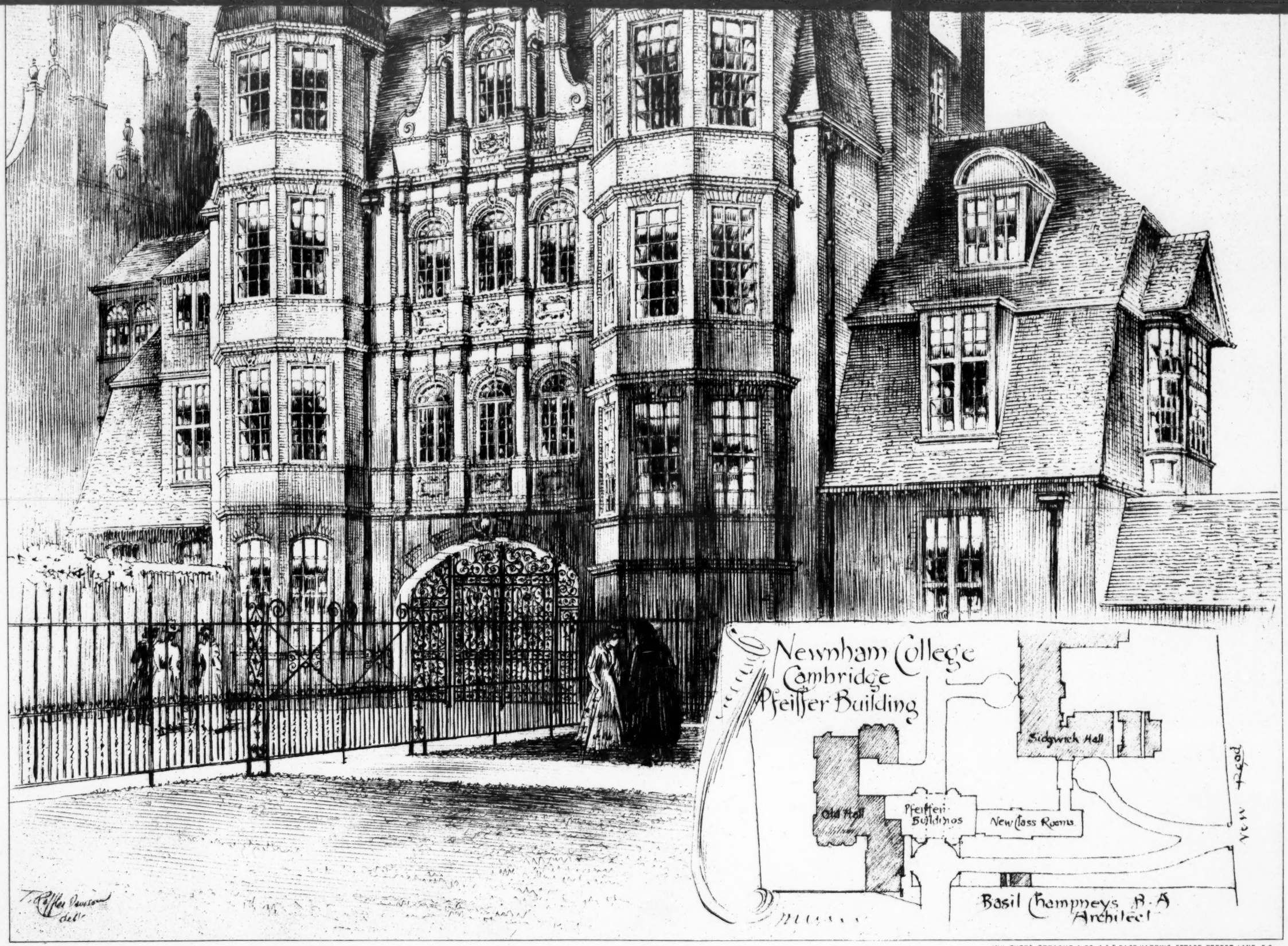

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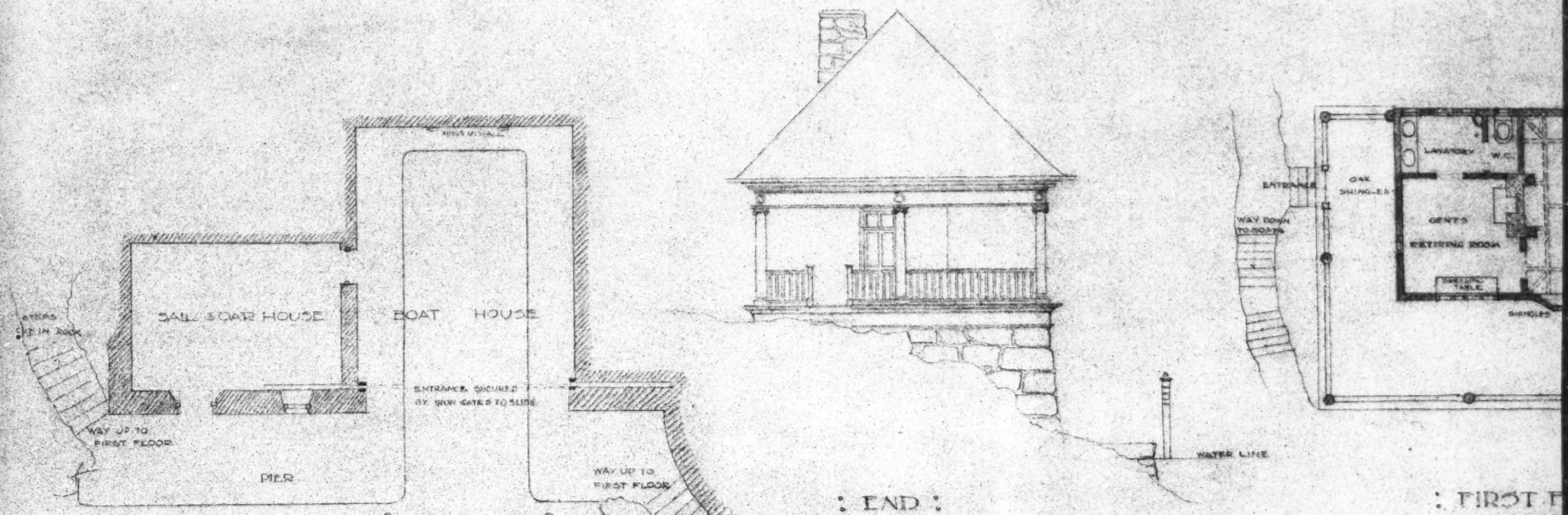

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GROUND PLAN

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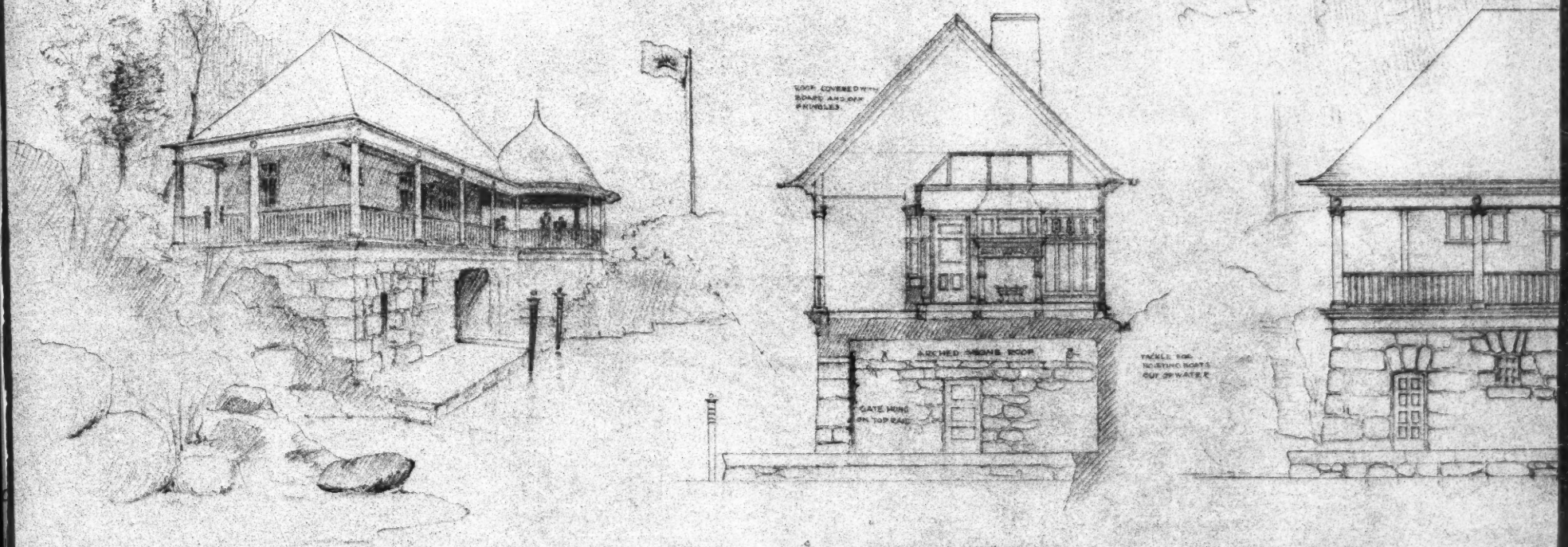
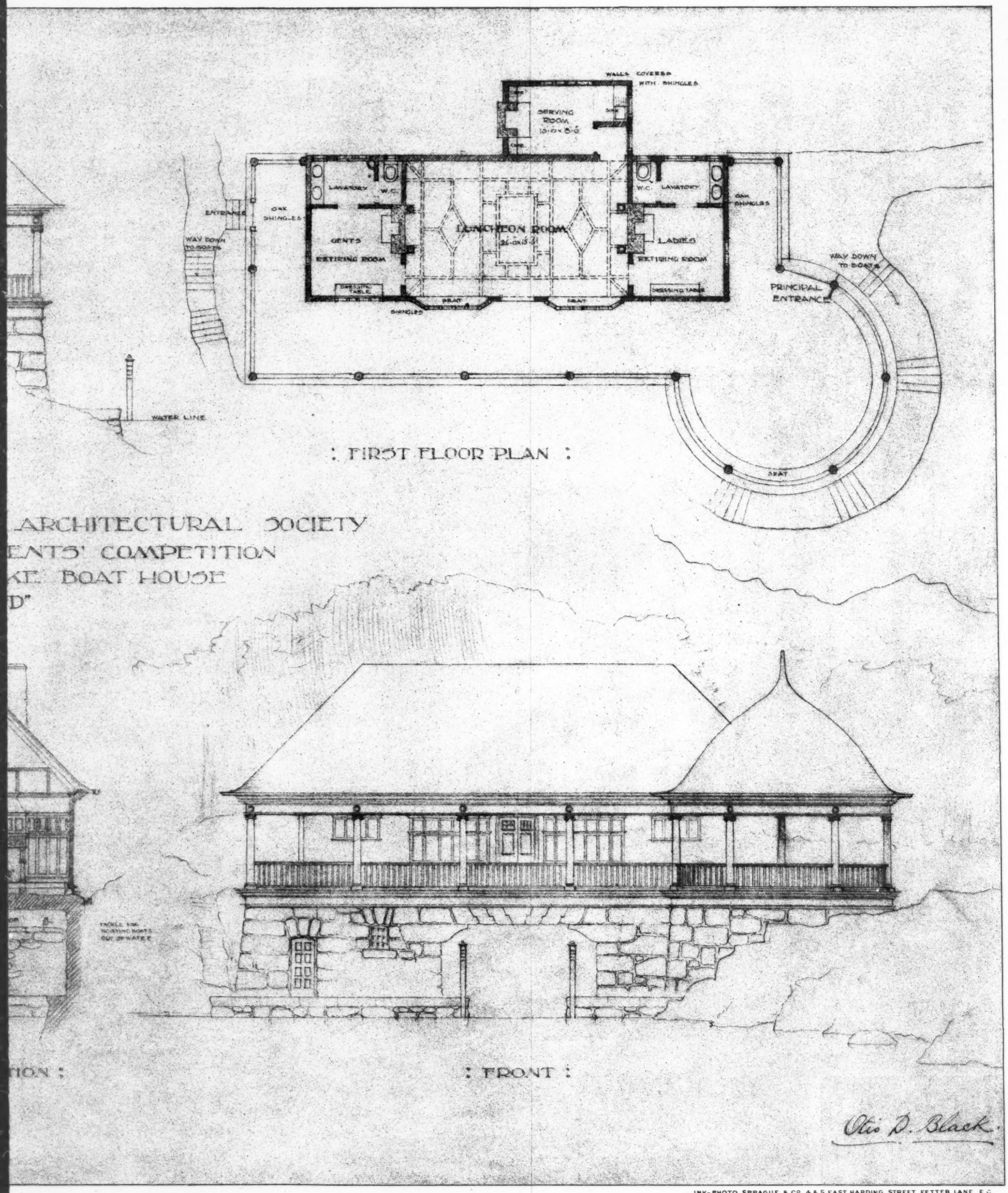
STUDENTS' COMPETITION
A LAKE BOAT HOUSE
BY "DUD"



: CROSS SECTION :



: FIRST FLOOR PLAN :

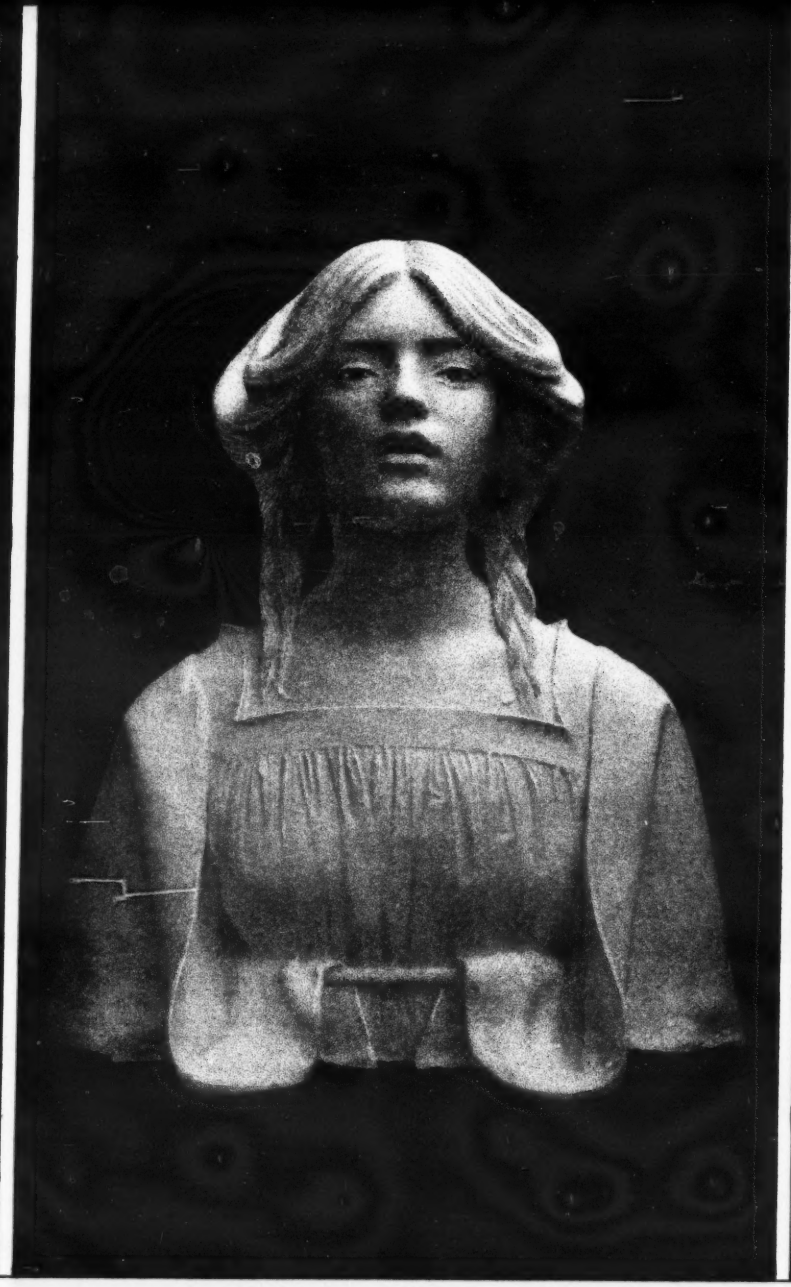
ARCHITECTURAL SOCIETY
ENTS' COMPETITION
KE. BOAT HOUSE
D"

: FRONT :

Otis D. Black.

INK-PHOTO. SPRAGUE & Co 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

ST. AGNES: BRONZE.—Mr. A. Drury.
(Royal Academy.)



"THE ORACLE:" MARBLE.—Mr. Albert Toft.
(Royal Academy.)

INK-PHOTO. SPRAGUE & Co 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

"NAUGHTY:" MARBLE.—Miss E. Halse.
(Royal Academy.)

SOME SCULPTURE OF THE YEAR.

ST. AGNES: BRONZE.—Mr. A. Drury.
(Royal Academy.)

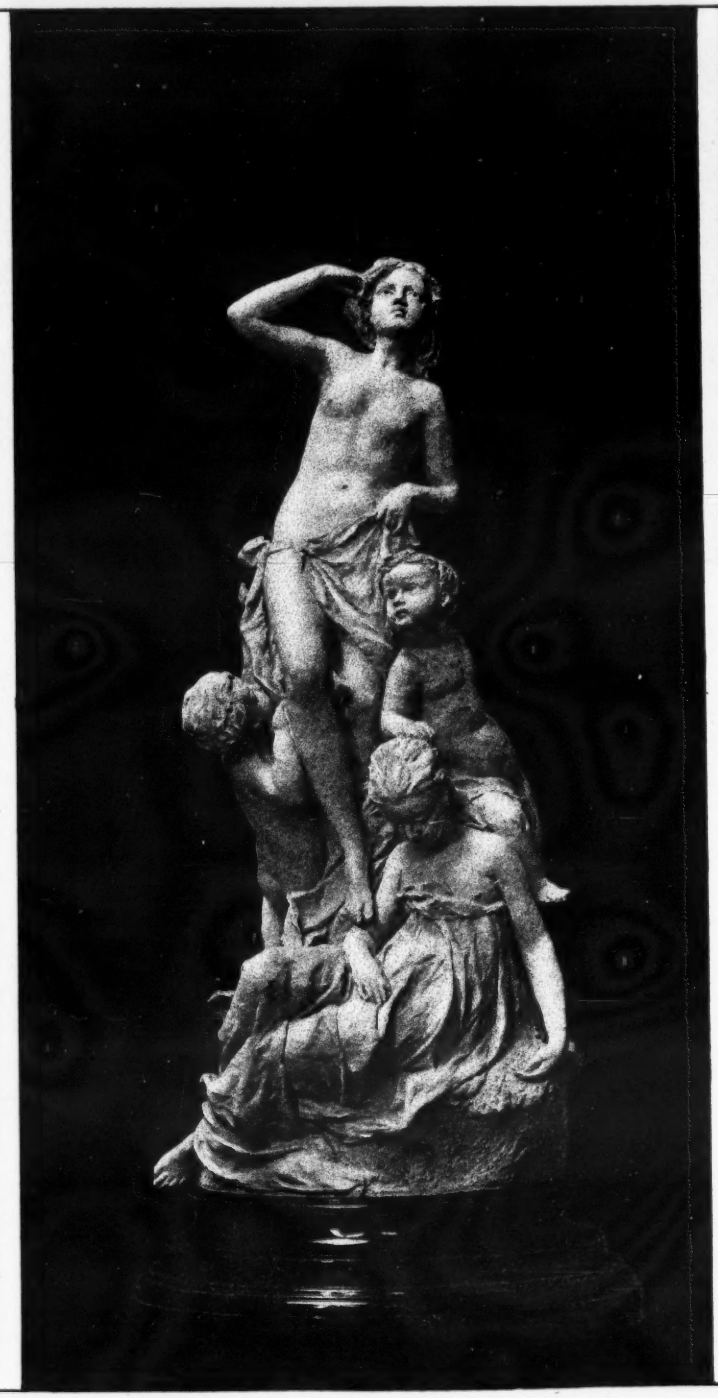
"THE ORACLE:" MARBLE.—Mr. Albert Toft.
(Royal Academy.)

SOME SCULPTURE OF THE YEAR.

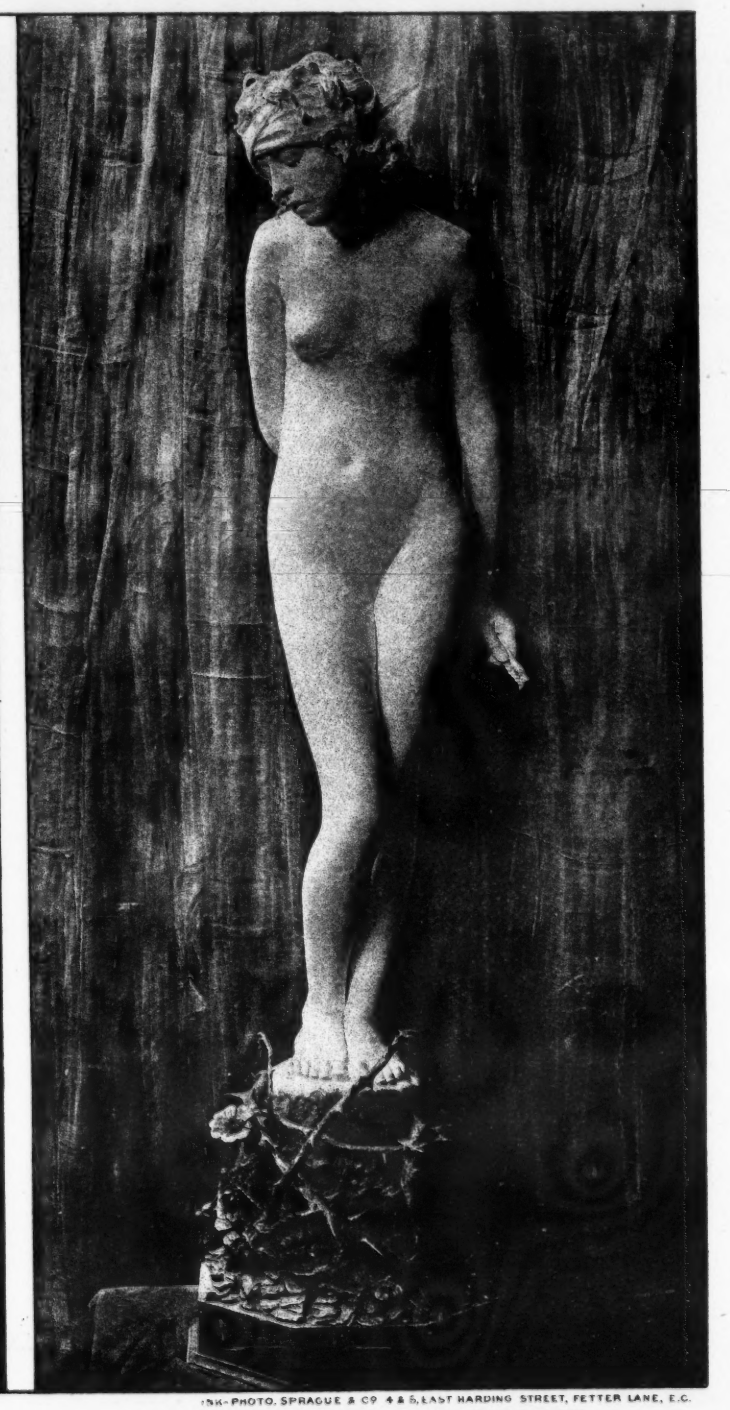
INK-PHOTO. SPRAGUE & Co 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

"NAUGHTY:" MARBLE.—Miss E. Halse.
(Royal Academy.)

"THE GOBLET OF LIFE:" PLASTER.—Mr. Albert Toft.
(Royal Academy.)



"RISING OF THE DAWN."—Mr. E. Roscoe Mullins.
(New Gallery.)



INK-PHOTO. SPRAGUE & Co 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

"A VANISHING DREAM."—Mr. A. C. Lucchesi.
(Royal Academy.)

SOME SCULPTURE OF THE YEAR.